NAVSEA 0924-062-0010

REVISION C

SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

PUBLISHED BY DIRECTION OF COMMANDER, NAVAL SEA SYSTEMS COMMAND

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
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ARLINGTON VA 22242-5160

IN REPLY REFER TO

9077
Ser 92Q/017
19 July 2001

From: Commander, Naval Sea Systems Command

Subj: PROMULGATION OF ADVANCE CHANGE NOTICE (ACN) 2-3 TO THE SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL, NAVSEA 0924-062-0010, REV C

Encl: (1) Summary of ACN 2-3 Changes
(2) SUBSAFE Requirements Manual Rev C ACN 2-3 Change Pages
(3) SUBSAFE Requirements Manual Rev C ACN 2-3 Receipt Verification Form

1. **Purpose**. To promulgate SUBSAFE Program administrative, certification technical requirement, and certfication maintenance changes to subject manual. Changes are summarized in enclosure (1).

2. **Action**. Incorporate ACN 2-3 using enclosure (2) change pages. When finished, insert this ACN transmittal letter, including enclosure (1), before the ACN 2-2 transmittal letter in the front of the manual and update the record of change page with ACN 2-3 accordingly. Complete enclosure (3) and return it to NAVSEA 92Q.

3. **Change Symbols**. Note that new, modified, or deleted text resulting from this ACN is indicated by a vertical change bar in the outside margin of each affected page. Change bars are not used to indicate supporting changes to the List of Effective Pages or the Index. Where material has merely shifted from one page to another as a result of the ACN, the only indication is that the affected pages are annotated with "ACN 2-3".

4. **Implementation**.

a. Effective for all Type Commander availabilities where the specification cut off date is after the ACN 2-3 issue date; effective for major depot availabilities, conducted by NAVSEA managed activities, where the specification cut off date is after the ACN 2-3 issue date and, effective for all availabilities

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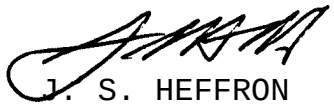
where the specification cut off date is before the ACN 2-3 issue date and no schedule or cost impact is involved.

b. Current SUBSAFE requirements for New Design/New Construction ships, as delineated in associated building specifications and contracts, remain in effect unless modified by other correspondence.

c. The requirements of this ACN shall be invoked upon receipt. If implementation will result in changes to cost or schedule, or both, this ACN shall not be implemented without NAVSEA and TYCOM approval.



J. S. HEFFRON
By Direction

Summary of ACN 2-3 Changes to the SUBSAFE Requirements Manual, Rev C

1. **CHAPTER 2 –** SUBSAFE PROGRAM ORGANIZATION AND RESPONSIBILITIES:

a. Various Section 2.2 paragraphs and Section 5.5.1.4.3: Changes NAVSEA "03" to "05" to reflect NAVSEA reorganization.

b. Section 2.2.j: Requires organizations performing work which affects SUBSAFE quality to have a training program, to include SUBSAFE awareness training.

c. Section 2.2.6: Clarifies duties and responsibilities for all SUBSAFE Program Directors (SSPDs) and adds those which apply only to Public Shipyard and Supervisor of Shipbuilding SSPDs.

d. Section 2.2.12: Adds DLA/DCMC, NAVICP, and NAVSEALOGCEN SUBSAFE Directors/Representatives to the list of SUBSAFE responsibilities already identified for the SUBMEPP SUBSAFE Director. Also clarifies their responsibilities.

2. **CHAPTER 4** - SUBSAFE CERTIFICATION TECHNICAL REQUIREMENTS:

a. Paragraphs 4.6.4.2.1.1d(3), 4.6.4.2.2.1b, and 4.6.4.2.3.1b(2): Clarify that, for material supplied by the Level I/SS Stock System, a Certificate of Compliance attesting to conformance with drawing requirements is not required.

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LIST OF EFFECTIVE PAGES

Dates of issue for the original and changed pages are:
Original..... 1 Jan 96
ACN 2-3..... 19 Jul 01

TOTAL NUMBER OF PAGES IN THIS MANUAL IS 304 CONSISTING OF THE FOLLOWING:

Page Numbers	Change in Effect
Title Page	Original
List of Effective Pages A and B	ACN 2-3
Change Record	Original
i and ii	Original
iii	ACN 2-3
iv and v	CHANGE 1
vi	Original
vii	CHANGE 1
viii thru x	Original
1-1 and 1-2	Original
1-3	CHANGE 1
1-4	Original
2-1 and 2-2	ACN 2-3
2-3 and 2-4	CHANGE 1
2-5 thru 2-10	ACN 2-3
2-11 and 2-12	CHANGE 1
3-1 thru 3-6	ACN 2-2
4-1 thru 4-7	Original
4-8 and 4-9	CHANGE 1
4-10 and 4-11	Original
4-12	CHANGE 1
4-13 thru 4-16	Original
4-17 thru 4-19	CHANGE 1
4-20 thru 4-23	Original
4-24	CHANGE 1
4-24.1 and 4-24.2	CHANGE 1
4-25	ACN 2-1
4-26 and 4-27	CHANGE 1
4-28 thru 4-35	Original
4-36	CHANGE 1
4-37 and 4-41	Original
4-42	CHANGE 1
4-43	ACN 2-2
4-44 and 4-45	ACN 2-3
4-46	ACN 2-1
4-46.1 and 4-46.2	CHANGE 1
4-47 and 4-48	CHANGE 1
4-49	Original
4-50	CHANGE 1
4-51 thru 4-56	Original
4-57 thru 4-60	CHANGE 1
4-61	Original
4-62 thru 4-64	CHANGE 1
5-1 thru 5-6	Original
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5-8 and 5-9	Original
5-10	ACN 2-3
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5-12 thru 5-18	Original
5-19 thru 5-22	CHANGE 1
5-22.1 and 5-22.2	CHANGE 1
5-23	CHANGE 1
5-24 thru 5-30	Original
6-1	Original
6-2	CHANGE 1
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6-4 and 6-5	ACN 2-1
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6-9 thru 6-14	Original
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6-21 thru 6-26	ACN 2-1
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B-1 and B-2	CHANGE 1
B-3	Original
B-4 thru B-6	CHANGE 1
B-7	Original
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B-10 and B-11	Original
B-12 thru B-16	CHANGE 1
B-17	Original
B-18 thru B-20	CHANGE 1
B-21 and B-22	Original
C-1	CHANGE 1
C-2 thru C-4	Original

LIST OF EFFECTIVE PAGES (CONT'D)

Page Numbers	Change in Effect
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C-13	Original
C-14 and C-15	CHANGE 1
C-16 thru C-22	Original
D-1 thru D-18	Original
E-1 thru E-32	Original
F-1 thru F-12	Original
GLOSSARY 1	ACN 2-2
GLOSSARY 2 thru GLOSSARY 8	Original
GLOSSARY 9	CHANGE 1
GLOSSARY 10	Original
GLOSSARY 11 thru GLOSSARY 13	CHANGE 1
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INDEX 1 thru INDEX 11	CHANGE 1
INDEX 12	Original
REFERENCES 1	Original
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CHAPTER 1

INTRODUCTION

1.1 PURPOSE.

This manual identifies the administrative and technical submarine safety certification criteria that must be satisfied to permit NAVSEA's initial certification of a submarine's material condition and a recommendation for unrestricted operations to a specified depth (usually test depth) as well as the technical and administrative requirements that must be met during the ship's operational life to maintain that certification. This certification provides maximum reasonable assurance of hull integrity to preclude flooding and of the operability and integrity of critical systems and components to control and recover from a flooding casualty.

1.2 SCOPE.

This manual sets forth the following:

a. Administrative and technical requirements for SUBSAFE certification.

b. Requirement to perform a design review to validate the adequacy of the original design and subsequent changes.

c. Requirements for maintaining satisfactory material condition to support continued unrestricted operations to test depth.

d. Organizational responsibilities and functions associated with implementing and executing SUBSAFE Program policies and procedures.

e. Requirements for record keeping, reporting, and retaining documentation associated with the SUBSAFE Program.

f. Requirement for functional audits.

g. Requirement for SUBSAFE Certification Audits (SSCAs) (Non-Nuclear).

h. Requirements for maintenance of certification including an Unrestricted Operations Maintenance Requirement Card (URO/MRC) Program and a mandatory Re-entry Control Program.

i. Requirement for SUBSAFE auditor personnel qualification programs.

1.3 SUBSAFE PROGRAM BACKGROUND.

On 10 April 1963, while engaged in a deep test dive, the nuclear submarine USS THRESHER (SSN 593) was lost at sea with all persons aboard. Based on the findings of a Court of Inquiry and the subsequent Joint Congressional Committee on Atomic Energy hearings into the loss of the THRESHER, it was concluded that a flooding casualty in the engine room, resulting from a piping failure in one of the salt water systems, was the most probable cause for the loss.

A THRESHER Design Appraisal Board determined that, although the basic design of this submarine class was sound, measures should be taken to improve the level of confidence in the material condition of the hull integrity boundary

and in the ability of submarines to control and recover from flooding casualties.

On 3 June 1963, a Submarine Safety Program was established within the then-designated Bureau of Ships to assure implementation of the THRESHER Court of Inquiry and THRESHER Design Appraisal Board recommendations. In addition, a Submarine Safety Steering Task Group (SSSTG) was established to provide high-level comprehensive attention to the Submarine Safety Program. One of the first actions taken under the Submarine Safety Program was the development of a "Submarine Safety Certification Criterion," outlining the minimum actions required to provide a satisfactory level of confidence in the integrity of submarine systems and the adequacy of certain damage control capabilities. This satisfactory level of confidence would, on a ship-by-ship basis, permit the removal of depth restrictions and allow a return to unrestricted operations to design test depth. The basic certification criterion was issued in BUSHIPS letter serial 525-0462, dated 20 December 1963, and became known as the "SubSafe Package."

On 1 July 1964, the Joint Congressional Committee on Atomic Energy expressed tacit approval of the scope of the Navy's planned program to improve the quality and safety of submarines already in the fleet.

On 20 December 1974, the Submarine Material Certification Requirements Manual for the Submarine Safety Program (NAVSEA 0924-062-0010) was issued to supersede the 20 December 1963 letter with its 37 subsequent changes. On 14 April 1987, Rev A of NAVSEA 0924-062-0010 was issued and superseded, in part, the original manual for all existing ships. Rev A of NAVSEA 0924-062-0010 was invoked in its entirety for the SSN 21 Class submarines.

Chief of Naval Operations statutory SUBSAFE responsibilities are delegated to Commander, Naval Sea Systems Command, who is responsible for the Submarine Safety Program as well as submarine safety certification responsibilities as defined in OPNAVINST 9110.1B. This manual assigns SUBSAFE Program responsibility to the Deputy Commander for Submarines (NAVSEA 92). Additionally, this manual assigns to the Director, Submarine Safety and Quality Assurance Division (NAVSEA 92Q), the responsibility, under the direction of NAVSEA 92, for implementation and management of the SUBSAFE Program.

1.4 LACK OF COMPLIANCE.

Forces Afloat, shipyards, and other repair activities have a basic obligation to effect repairs in full accordance with specifications and SUBSAFE requirements. There have been circumstances when all specifications or requirements have not been completely met, for reasons such as:

a. A misconception that specifications are only objectives, rather than minimum requirements for acceptability. As a result, departures from specification requirements may never be recorded and/or may not be reviewed and approved by proper authority.

b. A lack of adequate inspection, quality control, and management of the process for determining compliance with specifications.

c. A lack of understanding of specification requirements.

d. A lack of resources to enable permanent repairs, resulting in emergency temporary repairs.

e. A lack of training in the skills necessary to meet specifications.

f. A generally lax attitude toward non-operational aspects of ship's configuration (e.g., installation of lockers/stowage not included in, or in accordance with, ship's plans).

1.5 APPLICABILITY.

Policies, procedures, and technical requirements of the non-reactor plant portions of the SUBSAFE Program, as defined and delineated by this manual, shall apply to the initial certification of submarines and to the maintenance of certification for presently certified submarines.

The provisions of this manual are applicable to any activity involved with certifying or maintaining SUBSAFE certification. Only those activities identified in NAVSEANOTE 5000 are authorized to perform, delegate, or provide qualification for the performance of SUBSAFE work. The requirements contained in this manual in no way relieve contractors of their responsibility for meeting the requirements of other specifications invoked by contract. Reactor plant SUBSAFE requirements, implementation, supporting documentation, and certification documentation will be maintained and controlled by NAVSEA 08.

1.6 DOCUMENTATION HIERARCHY.

New submarines are constructed in accordance with the applicable Detail Shipbuilding Specifications, and existing submarines are maintained in accordance with the applicable Work Package and the Deep Diving General Overhaul Specifications (DDGOS). In either case, the applicable contractual document shall specify the following order of precedence for identifying SUBSAFE certification requirements and boundaries:

a. The SUBSAFE Requirements Manual.

b. Submarine Safety Certification Boundary (SSCB) Book.

c. CINCLANTFLT/CINCPACFLTINST 4790.3, Joint Fleet Maintenance Manual (JFMM).

NAVSEA should be notified of any conflicts between these documents for proper resolution. Silence of one document with respect to details shown in another document or in another section of the same document shall not be considered an inconsistency or conflict.

1.7 MANUAL FORMAT AND REFERENCING METHODOLOGY.

The content of this manual is presented as chapters and paragraphs within chapters. Reference to material location is structured as exemplified below:

a. When reference is made to Section 5.5.3, such reference applies to 5.5.3 and its subordinate paragraphs, i.e., 5.5.3, 5.5.3.1, 5.5.3.2, etc.

b. When reference is made to Paragraph 5.5.3, such reference applies to 5.5.3 only.

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CHAPTER 2

SUBSAFE PROGRAM ORGANIZATION AND RESPONSIBILITIES

2.1 PURPOSE.

This chapter identifies the organizational structure and responsibilities of groups and positions directly involved in supporting the SUBSAFE Program.

2.2 PROGRAM ORGANIZATION AND RESPONSIBILITIES.

a. The Submarine Safety Oversight Committee (SSOC) is responsible for ensuring that the objectives of the SUBSAFE Program are being met by NAVSEA.

b. The SUBSAFE Program is guided and directed by the Submarine Safety Steering Task Group (SSSTG), which is chaired by the Deputy Commander for Submarines (NAVSEA 92) and reports to the Commander, Naval Sea Systems Command.

c. NAVSEA 92Q is responsible to NAVSEA 92 for the implementation, administration, and coordination of the non-reactor plant portions of the SUBSAFE Program, and for ensuring compliance with the program.

d. The Submarine Safety Working Group (SSWG) members provide NAVSEA 92Q direct liaison and input regarding implementation of and improvements to the SUBSAFE Program.

e. NAVSEA 08 is responsible for the implementation and administration of reactor plant portions of the SUBSAFE Program, and for ensuring compliance with those portions of the program.

f. Each NAVSEA Submarine Program Manager (PMS) retains responsibility for executing the SUBSAFE Program for assigned ships. SUBSAFE boundary decisions will be coordinated between the PMS and NAVSEA 92Q to ensure consistency with established SUBSAFE policy.

g. Cognizant NAVSEA technical codes will provide technical assistance to the PMSs and NAVSEA 92Q as requested to ensure timely resolution of SUBSAFE issues and problems. The final authority for the technical requirements of the SUBSAFE Program is the NAVSEA Engineering Directorate, NAVSEA 05.

h. The Shipyard Commanders, Supervisors of Shipbuilding, Conversion, and Repair, and TYCOMs (i.e., COMSUBLANT and/or COMSUBPAC) are responsible for developing and implementing necessary instructions and procedures to meet the requirements of this manual.

i. Acquisition of the first and early submarines of a new class or of major new submarine systems/subsystems may be undertaken by a Program Executive Officer (PEO) or a Direct Reporting Program Manager (DRPM) under the Assistant Secretary of the Navy (ASN) for Research, Development and Acquisition (RD&A) rather than by NAVSEA. Throughout this manual the terms NAVSEA, NAVSEA technical codes, and NAVSEA Program Managers shall include PEO/DRPM, PEO/DRPM technical codes, and PEO Program Managers for submarines and submarine systems/subsystems under their cognizance. Due to the statutory nature of NAVSEA 92's responsibility for the SUBSAFE Program, any submarine new construction or major depot availability SUBSAFE and/or URO certifications to be performed by a PEO or DRPM shall be by formal agreement with NAVSEA 92.

j. Organizations identified in NAVSEANOTE 5000 as qualified to perform SUBSAFE work shall establish and maintain procedures for identifying training needs and provide for the training of all personnel performing activities affecting SUBSAFE quality. This shall include periodic SUBSAFE awareness training. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training, and/or experience, as required. Appropriate records of training shall be maintained.

2.2.1 SUBMARINE SAFETY OVERSIGHT COMMITTEE (SSOC).

The SSOC provides independent command level oversight of the SUBSAFE Program to ensure, from a Commander, Naval Sea Systems Command perspective, that the purpose and intent of the SUBSAFE Program is being met by the Deputy Commander for Submarines (NAVSEA 92). The SSOC shall provide policy guidance and support in matters pertaining to the SUBSAFE Program where timely resolution or agreement cannot be attained by the SSSTG. The SSOC shall meet at least annually.

2.2.1.1 SSOC MEMBERSHIP.

The membership of the SSOC is as follows:

Chairman:	NAVSEA 09
Members:	PEO-SUB
	NAVSEA 05
	NAVSEA 04
	NAVSEA 92
	NAVICP-Mechanicsburg

2.2.2 SUBMARINE SAFETY STEERING TASK GROUP (SSSTG).

The SSSTG (established in June of 1963) provides high level, comprehensive attention to ensure adequate provision of safety features in current and future submarine construction, conversion, and major depot availability programs. The SSSTG will define the scope of the SUBSAFE Program, review program progress, redirect efforts as necessary, assign responsibilities, identify tasks associated with the program, and approve or disapprove proposed policy changes. The SSSTG shall provide policy guidance on all matters pertaining to the SUBSAFE Program and other submarine safety and quality assurance aspects where resolution or agreement is beyond the scope of an individual submarine code's authority. In carrying out the responsibilities for the SUBSAFE Program assigned by the Commander, Naval Sea Systems Command, the Deputy Commander for Submarines (NAVSEA 92) is assigned as Chairman of the SSSTG. The SSSTG shall meet at least semiannually to review the status of the SUBSAFE Program as presented by NAVSEA 92Q.

2.2.2.1 SSSTG MEMBERSHIP.

The membership of the SSSTG is as follows:

Chairman:	NAVSEA 92
Vice-Chairman:	NAVSEA 05
Members:	PEO-SUB
	PEO-SUB-B
	NAVSEA 92B
	NAVSEA 05B
	Submarine Platform Program Managers
	Other support organizations as requested by the Chairman

2.2.3 DIRECTOR, SUBMARINE SAFETY AND QUALITY ASSURANCE DIVISION (NAVSEA 92Q).

The Director, under the Deputy Commander for Submarines (NAVSEA 92), is responsible and accountable for implementation and management of the Submarine Safety and Quality Assurance Programs. As Director of the SUBSAFE Program, he has the following responsibilities:

a. Implement, administer, coordinate, and ensure compliance with the non-reactor plant portions of the SUBSAFE Program.

b. Function as the primary point of contact within NAVSEA Headquarters in all matters relating to SUBSAFE Program policy requirements.

c. Function as liaison officer for NAVSEA in dealings with outside activities in all SUBSAFE related matters.

d. Provide coordination, consultation, and assistance to submarine activities on SUBSAFE matters and on proper execution of SUBSAFE tasks.

e. Act as recorder for the SSOC.

f. Act as recorder for the SSSTG.

g. Chair the SSWG.

h. Serve as custodian for this manual and maintain the master change status accounting system described in paragraph 3.2.1.4.

i. Act as approval authority for editorial changes to this manual and coordinate and initiate other changes and revisions as necessary to maintain this manual current and effective.

j. Monitor compliance and provide guidance and direction for SUBSAFE Program implementation.

k. Develop and maintain a program for the conduct of NAVSEA SUBSAFE audits.

l. Coordinate, identify, and initiate change action for manuals, specifications, standards, and documents required to support the SUBSAFE Program.

m. Establish and maintain a SUBSAFE Program feedback system to collect, review, classify, evaluate, and disseminate information affecting the SUBSAFE Program.

n. Certify to NAVSEA 92 that shipyard work complies with SUBSAFE requirements and supports key events such as Fast Cruise, sea trials, and ship completion.

o. Evaluate and recommend any necessary corrective action for public shipyards/SUPSHIPs/private shipyards, and other activities or participants in the SUBSAFE Program as it relates to non-reactor plant SUBSAFE work. Ensure that NAVSEA 08 is kept informed of any SUBSAFE work that may affect reactor plant systems.

p. Provide activities participating in the SUBSAFE Program clarification of various NAVSEA instructions, letters, and other directives, relating to the SUBSAFE Program. Ensure directives are implemented in a timely manner and are properly executed.

q. Ensure issuance of required NAVSEA instructions, directives or procedures, and dissemination of information needed to carry out the SUBSAFE Program.

r. Evaluate the SUBSAFE Program at each shipyard and other applicable activities to ensure that the program is supported by adequate auditor training. Provide course material as needed, and coordinate/monitor training.

s. Provide liaison and coordination with all NAVSEA organization representatives to provide a single unified approach to SUBSAFE.

t. Maintain liaison with shipyards and other activities and participants in the SUBSAFE Program to obtain or present information relative to SUBSAFE.

u. Ensure that a system exists such that all SUBSAFE problems and SUBSAFE related correspondence (e.g., departures, waivers, messages) are:

(1) Consistent with SUBSAFE policy.

(2) Reviewed for technical adequacy.

(3) Responded to expeditiously.

(4) Evaluated and substantiated, with resolution provided concerning the impact on future designs.

v. Review status of ships under construction or in major depot availabilities with the activity's SUBSAFE Director and schedule NAVSEA audits as deemed appropriate.

w. Ensure accuracy, adequacy, and completeness of NAVSEA SUBSAFE related audits and maintain a file of SUBSAFE problems/resolutions and SUBSAFE related audits for shipyards and other activities.

x. Determine the factual accuracy of and concur with all NAVSEA outgoing messages that report SUBSAFE certification status to Type Commanders.

y. Develop, conduct, and maintain internal audits to ensure NAVSEA compliance with SUBSAFE Program requirements.

z. Monitor all SUBSAFE first and second tier reference documentation to ensure that the SUBSAFE Program is not adversely impacted by proposed changes.

aa. Evaluate submarine reports (e.g., CASREPs, Incident and Trouble Reports, etc.) for trends and recommend SUBSAFE Program improvements where necessary.

ab. Review from a safety standpoint and provide recommendations on requests to extend the operating cycle of certified submarines.

ac. Act as the NAVSEA Submarine Safety Officer.

2.2.4 DEPUTY DIRECTOR, NAVSEA SUBMARINE SAFETY AND QUALITY ASSURANCE DIVISION (NAVSEA 92QB).

NAVSEA 92QB functions under the Director, Submarine Safety and Quality Assurance Division, NAVSEA 92Q. His primary mission is to ensure effective, overall implementation and proper execution of the SUBSAFE Program.

2.2.5 NAVSEA SUBMARINE PROGRAM MANAGER (PMS).

Program Managers are responsible for executing the SUBSAFE Program for assigned new construction submarines and assigned delivered submarines when undergoing major depot availabilities. PMSs have the following specific responsibilities:

a. Certify to NAVSEA 92 that assigned new construction submarines and those undergoing major depot availabilities meet the requirements of this manual and are satisfactory to conduct sea trials to design test depth. Following satisfactory completion of sea trials and acceptance of the ship, or satisfactory completion of major depot availability trials, provide, for NAVSEA 92 signature, a recommendation to CNO and Fleet Commanders that the submarine be authorized to conduct unrestricted operations to design test depth.

b. Ensure that the requirements of this manual are invoked by the specifications for all new construction contracts and major depot availability work packages.

c. Act as the central point of contact for receipt, processing, and approval action on all hull specific waivers, deviations, departures, NAVSEA SUBSAFE Certification Audit (SSCA) recommendations and related SUBSAFE correspondence.

d. Ensure technical and administrative review of SUBSAFE correspondence complies with the requirements of this manual.

e. Obtain formal mutual agreement between TYCOM and NAVSEA for any SUBSAFE issues that have indeterminate cause and responsibility.

f. Maintain complete files of all hull specific SUBSAFE correspondence.

g. Provide members to support SUBSAFE audits, as requested.

2.2.6 SUBSAFE PROGRAM DIRECTOR (SSPD).

A SUBSAFE Program Director (SSPD), and an alternate designated to act in the SSPD’s absence, will be assigned at all Supervisor of Shipbuilding offices, private shipyards, public shipyards, Navy Laboratory/Research Centers and private ship repair organizations involved in the SUBSAFE Program. The SSPD functions as the activity's focal point for SUBSAFE matters and is accountable and responsible for implementation and proper execution of the SUBSAFE Program within the activity. The SSPD will be supported by such staff and assistants as determined by the activity. For Public Shipyards, the SSPD shall be assigned full time to the position.

2.2.6.1 SUBSAFE PROGRAM DIRECTOR (SSPD) DUTIES AND RESPONSIBILITIES.

In support of the SUBSAFE Program, all SSPDs shall:

a. Represent Top Level Management across all activity organizational lines to expedite problem solving and provide liaison. Problem solving throughout the activity involves the entire scope of SUBSAFE, from planning through production, inspection, test, and final fleet acceptance.

b. Ensure the activity’s instructions, procedures, directives, processes, production, and quality programs comply with SUBSAFE requirements.

c. Organize, plan, and direct the activity’s SUBSAFE Program as it relates to non-reactor plant submarine work.

d. Ensure various NAVSEA instructions, letters, and other directives relating to the SUBSAFE Program are disseminated and implemented in a timely manner.

e. Provide direct liaison with all organization represenitives within the activity and act as the central contact point within the activity in all matters concerning the SUBSAFE Program to ensure a single, unified approach to SUBSAFE.

f. Ensure guidance for implementation of NAVSEA directives results in complete SUBSAFE coverage for non-reactor plant cognizant areas of responsibility and that Naval Reactors Representative Office (NRRO) personnel are kept informed of any SUBSAFE work that may affect reactor plant systems.

g. Ensure that training adequately supports personnel involved in SUBSAFE work and certification processes. Training includes familiarization with the SUBSAFE Program requirements and procedures that implement or verify compliance with these requirements, as applicable to the work and certification being performed.

h. Establish liaison with personnel at NAVSEA 92Q, and other activities performing/overseeing SUBSAFE work to obtain or present information relative to SUBSAFE issues.

i. Serve as a member of the SSWG.

j. Ensure traceability and auditability of records and material needed to support SUBSAFE requirements, and to demonstrate that the activity has complied with all requirements needed to support certification.

k. As appropriate, review the status of ships under construction or in major depot availabilities and determine dates of and schedule for the NAVSEA SUBSAFE Certification Audit (SSCA) or other types of audits.

l. Periodically review SUBSAFE work in progress and have authority to stop work not in compliance with SUBSAFE requirements.

m. Maintain a file of activity SUBSAFE problems/resolutions and SUBSAFE functional audits.

n. Establish and serve as chairman of a local SUBSAFE Improvement Committee (SSIC). The SSIC will review SUBSAFE implementation within the activity and recommend actions for SUBSAFE Program upgrade and improvement. Committee members will be drawn from diverse trade skill levels, disciplines, and expertise. The SSPD will use this group as an element for the SSPD’s participation in SUBSAFE discussions with other activities.

o. Notify NAVSEA 92Q when a conflict is identified between the SUBSAFE Program requirements and their implementation.

p. Report in a timely manner to NAVSEA 92Q significant problems affecting SUBSAFE and provide copies of SUBSAFE related CASREPs, Incident, and Trouble Reports or their equivalants.

q. Participate in internal shipyard SUBSAFE audits. Participate as a qualified NAVSEA SUBSAFE auditor as requested by NAVSEA. Ensure adequate auditor training, provide course material as required, and monitor/coordinate training. Provide qualified auditors to support NAVSEA audits as requested.

2.2.6.2 FURTHER DUTIES AND RESPONSIBILITIES OF PUBLIC SHIPYARDS AND SUPERVISOR OF SHIPBUILDING SSPDs.

Duties and responsibilities of Public Shipyard and Supervisor of Shipbuilding SSPDs, in addition to those identified in 2.2.6.1 above, are as follows:

a. Certify to the Shipyard Commander/Supervisor of Shipbuilding, Conversion, and Repair that the system used for certifying shipyard work, including off-yard work, complies with SUBSAFE requirements and supports Fast Cruise, sea trials, ship completion, or other submarine related key events.

b. Serve as liaison for NAVSEA in all SUBSAFE matters related to sea trial certification and audits.

c. Ensure accuracy, adequacy, and completeness of internal SSCAs and forward reports of these internal audits to NAVSEA on time to support NAVSEA SSCAs.

2.2.7 SHIPYARD COMMANDER.

The Shipyard Commander as Supervising Authority has the responsibility to develop and implement necessary instructions and procedures to meet the requirements of this manual.

2.2.8 SUPERVISOR OF SHIPBUILDING, CONVERSION AND REPAIR.

The Supervisor of Shipbuilding, Conversion and Repair, as Supervising Authority, has the responsibility to develop and implement necessary instructions and procedures to meet the requirements of this manual.

2.2.9 TYPE COMMANDER.

The Type Commander has the responsibility to:

a. Maintain SUBSAFE certification in accordance with OPNAVINST 9110.1B.

b. Develop and implement necessary instructions and procedures to meet the requirements of this manual to ensure they are adhered to during TYCOM availabilities.

c. Provide NAVSEA 92Q with information copies of all SUBSAFE related CASREPs and other SUBSAFE problem reports.

d. Provide a representative for the SSWG.

2.2.10 NAVSEA SUBMARINE PROGRAM MANAGER (PMS) SUBMARINE SAFETY DIRECTOR.

A Submarine Safety Director, and an alternate designated to act in his or her absence, shall be appointed by each PMS. This Director's primary mission is to ensure dissemination and implementation of SUBSAFE Program requirements within the individual PMS and to coordinate with the NAVSEA Submarine Safety Officer (NAVSEA 92Q) and outside activities in SUBSAFE matters.

2.2.10.1 NAVSEA PMS SUBMARINE SAFETY DIRECTOR RESPONSIBILITIES.

The Director has the responsibility to:

a. Function as the primary point of contact within the PMS in all matters relating to SUBSAFE.

b. Function as liaison officer in dealing with outside activities in ship acquisition or maintenance matters relating to SUBSAFE.

c. Provide coordination, consultation, and assistance to codes within the PMS on SUBSAFE matters for ship acquisition or maintenance.

d. Disseminate information related to and provide guidance for the SUBSAFE Program within the PMS.

e. Be knowledgeable of the requirements of this manual and related data concerning SUBSAFE matters.

f. Ensure effective and timely implementation of SUBSAFE requirements in contracts.

g. Ensure that a system exists that establishes and maintains, by hull number, a complete file, or traceability to the records, of all SUBSAFE related correspondence.

h. Serve as a member of the SSWG.

i. Provide NAVSEA 92Q with information copies of all SUBSAFE related correspondence.

2.2.11 NAVSEA 05 SUBMARINE SAFETY DIRECTOR.

A Submarine Safety Director, and an alternate designated to act in his or her absence, shall be appointed by NAVSEA 05. This Director's primary mission is to ensure dissemination and implementation of SUBSAFE Program requirements within NAVSEA 05 and to coordinate with the NAVSEA Submarine Safety Officer (NAVSEA 92Q) and outside activities in SUBSAFE matters.

2.2.11.1 NAVSEA 05 SUBMARINE SAFETY DIRECTOR RESPONSIBILITIES.

The Director has the responsibility to:

a. Function as the primary point of contact within NAVSEA 05 in all matters relating to SUBSAFE.

b. Function as liaison officer in dealing with outside activities in technical matters relating to SUBSAFE.

c. Provide coordination, consultation, and assistance to groups within NAVSEA 05 on SUBSAFE technical matters.

d. Disseminate information related to and provide guidance for the SUBSAFE Program within NAVSEA 05.

e. Be knowledgeable of the requirements of this manual and related data concerning SUBSAFE matters.

f. Serve as a member of the SSWG.

2.2.12 DLA/DCMC, NAVICP, NAVSEALOGCEN, SUBMEPP SUBSAFE DIRECTOR/REPRESENTATIVE.

A Submarine Safety Director/Representative, and an alternate designated to act in his or her absence, shall be appointed at the activity. The Director's/Representative's primary mission is to ensure dissemination and implementation of SUBSAFE Program requirements within the activity and to coordinate with NAVSEA 92Q and outside activities in SUBSAFE matters.

2.2.12.1 DLA/DCMC, NAVICP, NAVSEALOGCEN, SUBMEPP SUBSAFE DIRECTOR/REPRESENTATIVE RESPONSIBILITIES.

The Director/Representative has the responsibility to:

a. Function as the primary point of contact within the activity on SUBSAFE related matters.

b. Function as the activity's primary point of contact in dealing with outside activities on SUBSAFE related matters.

c. Be knowledgeable of SUBSAFE Program requirements.

d. Provide direction, consultation, and assistance to the activity's internal codes on SUBSAFE matters.

e. Provide direct liaison with the activity's organizational representatives to ensure a uniform approach to SUBSAFE.

f. Disseminate SUBSAFE information and guidance within the activity.

g. Ensure various NAVSEA instructions, letters, and other directives relating to the SUBSAFE Program are appropriately implemented in a timely manner.

h. Ensure that the activity's instructions, procedures, products, and quality programs fully comply with SUBSAFE Program requirements.

i. Ensure accuracy, adequacy, and completeness of all SUBSAFE audits, including the SUBSAFE portion of program audits.

j. Ensure traceability and accountability of records to demonstrate to NAVSEA audit teams that the activity has complied with all requirements needed to support certification.

k. Provide audit support as a qualified NAVSEA auditor during SUBSAFE Certification Audits (SSCAs) and Functional Audits conducted under the direction of NAVSEA and provide other qualified auditors to support these audits as requested by NAVSEA 92Q.

l. Serve as a member of the SSWG.

2.2.13 SUBMARINE SAFETY WORKING GROUP (SSWG).

The SSWG members will provide NAVSEA 92Q direct liaison and input regarding the SUBSAFE Program, its implementation, and improvement. The SSWG shall meet at least annually and at other times directed by its Chairman. In addition to acting on overall concerns for the SUBSAFE Program, the SSWG will specifically address the following:

a. Specific problems and recommendations regarding:

(1) SUBSAFE Requirements Manual.

(2) SUBSAFE Program support documentation.

(3) SUBSAFE problem response.

(4) Auditor training.

(5) Records, drawings, and data.

(6) SUBSAFE trend analysis.

b. Shipyard and NAVSEA compliance and problem areas implementing the SUBSAFE Program.

c. Fleet compliance and problem areas implementing the SUBSAFE Program.

d. Shipyard or other activities audit program status.

2.2.13.1 SSWG MEMBERSHIP.

The membership of the SSWG includes:

Chairman:	NAVSEA 92Q
Members:	NAVSEA 92Q Deputy Director, SEA 92QB
	NAVSEA 92T SUBSAFE Director
	NAVSEA 92C SUBSAFE Director
	NAVSEA 05 SUBSAFE Director
	NAVSEA 04XQ SUBSAFE Coordinator
	PMS350 SUBSAFE Director
	PMS392 SSN SUBSAFE Director
	PMS392 SSBN SUBSAFE Director
	PMS395 SUBSAFE Director
	PMS450 SUBSAFE Director
	Private Shipyard SUBSAFE Program Directors
	Public Shipyard SUBSAFE Program Directors
	DLA/DCMC SUBSAFE Director
	SUBMEPP SUBSAFE Director
	SUPSHIP SUBSAFE Program Directors
	NSWCCD-SSES SUBSAFE Program Director
	NUWC SUBSAFE Program Director
	NAVICP Representative
	NAVSEALOGCEN Representative
	COMSUBLANT Representative
	COMSUBPAC Representative

2.3 SUBSAFE CERTIFICATION.

2.3.1 SUBSAFE CHRONOLOGY.

The following outlines the general chronology of events associated with initial SUBSAFE certification of satisfactory material condition for unrestricted operations to test depth and the maintenance of that certification.

a. The submarine is constructed in accordance with this manual as implemented by the applicable specifications. At the end of the construction period, the submarine is initially SUBSAFE certified by NAVSEA as described in Chapter 5 of this manual. The NAVSEA SUBSAFE certification of satisfactory material condition is accompanied by a recommendation for unrestricted operations to a specified depth (usually test depth).

b. Following initial certification, the TYCOM is responsible for the maintenance necessary to maintain material condition for unrestricted operations to test depth.

The TYCOM directs continued conformance with the requirements of this manual for maintaining this certification.

c. The TYCOM ensures maintenance of satisfactory material condition and maintenance of SUBSAFE certification by conducting periodic audits in accordance with SECNAVINST 5040.3.

d. Should nonconformities or special incidents occur (e.g., ship collision, grounding, depth excursions, shock experience), the TYCOM takes such actions as he deems necessary. This may include restriction of the submarine operating depth in accordance with OPNAVINST 9110.1 and consultation with NAVSEA for resolution of relevant technical matters.

e. NAVSEA continues to support the TYCOM's effort to maintain acceptable material condition by:

(1) Certifying to the TYCOM that the material condition of all SUBSAFE work performed during major depot level availabilities by NAVSEA managed activities or under NAVSEA administered contracts is satisfactory for maintaining SUBSAFE certification.

(2) Providing certified material/components for use by repair activities and Forces Afloat.

(3) Maintaining the guidance herein current.

(4) Maintaining Unrestricted Operations Maintenance Requirement Card (URO/MRC) requirements current.

(5) Resolving technical problems associated with the SUBSAFE Program.

2.3.2 CERTIFICATION RESPONSIBILITY.

The preceding chronology, and the certification process in Chapter 5, describe a division of responsibility in certifying SUBSAFE work; NAVSEA certifies work done by NAVSEA managed activities, and the Type Commander is responsible for sustaining certification of all other systems and components. This division of responsibility necessitates that there be clear formal communication among the responsible parties to ensure that all SUBSAFE systems and components remain properly certified.

Clear communication is especially important when a SUBSAFE deficiency arises. If the cause cannot be attributed to a specific area of responsibility, then it is essential that the Type Commander and NAVSEA formally agree that the corrective action is adequate and encompasses all reasonable causes without regard to divisions in responsibility.

2.4 CERTIFICATION AND STOCKING OF NON-REACTOR PLANT MATERIAL INTENDED FOR USE WITHIN THE SUBSAFE BOUNDARY.

SSG 81

NAVSUP/NAVSEAINST 4440.16, Level I/SUBSAFE (LI/SS) Stock Program, promulgated the policies and procedures to control administering, procuring, receiving, using, stocking, and issuing Level I and SUBSAFE certified material. The Naval Inventory Control Point (NAVICP), Mechanicsburg, Pennsylvania, procures the material and retains inventory control. Portsmouth Naval Shipyard (PNSY) provides material certification by conducting receipt inspections which assure that material composition and condition are correct, that inspections and tests required by contract specifications have been accomplished, and that traceability requirements of this manual and NAVSEA 0948-LP-045-7010 are met. When directed by NAVICP-Mechanicsburg, stocking and issuing activities

will ship pre-certified material, properly identified with traceability markings, to the requesting activity.

For material provided by the Level I/SUBSAFE Stock Program, material certification shall be attested to by a Material Identification and Control (MIC) number permanently marked on the item in accordance with Appendix D of NAVSEA 0948-LP-045-7010. If backup documentation is needed, it shall be available, upon request, from the certifying activity. Pre-certified LI/SS items received from a stocking activity that were certified 1 Jan 1990 or later as identified by the Julian date marked on the item require only the inspections specified in NAVSEA 0948-LP-045-7010 for pre-certified material. Pre-certified LI/SS items received from the LI/SS Stock Program that were certified prior to 1 Jan 1990 may be used in SUBSAFE applications provided the receiving activity confirms that one of the following applies:

a. The material is marked <SS>.

b. The applicable shipping documentation is annotated with a Special Material Identification Code (SMIC) of “SS”.

c. Accomplishment of SUBSAFE attributes is attested to by a SUBSAFE certification statement in accordance with Section 4.6.12.1.

d. The only SUBSAFE certification attribute applicable to the material is chemical and mechanical property material verification (VM). Examples of such material include fasteners and raw stock.

e. The material is verified to have met all applicable SUBSAFE certification attributes via documented communication with the applicable certification activity.

When Level I/SUBSAFE material is required for use within the SUBSAFE boundary but is not available through the LI/SS Stock Program, the material may be obtained from a certifying activity identified below:

Activity	Certifying Activity Designator (CAD)
Newport News Shipbuilding	NN
Naval Undersea Warfare Center, Newport (NUWC)	NUSC
Norfolk Naval Shipyard	N
Puget Sound Naval Shipyard	S
Pearl Harbor Naval Shipyard	P
General Dynamics/Electric Boat Division	G
Philadelphia Naval Shipyard (castings only)	H
NSWC-CD SSES	QQ
Portsmouth Naval Shipyard	A

Material received from any other source must be accompanied by proper OQE and shall be certified and marked by a certification activity identified above prior to use. OQE and recertification are not required for attributes traceable from Material Identification Control (MIC) numbers previously assigned and applied by a certifying activity identified above in accordance with NAVSEA 0948-LP-045-7010. Material previously certified by Charleston Naval Shipyard (CAD C), Mare Island Naval Shipyard (CAD MS), and Yorktown Naval Weapons Station (CAD YT) is acceptable.

SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

CHAPTER 3

SUBSAFE PROGRAM ADMINISTRATION

3.1 PURPOSE.

This chapter provides guidance on SUBSAFE Program administration, including program modifications and associated documentation control.

3.2 PRESENTATION OF SUBSAFE PROGRAM ISSUES.

SUBSAFE Program issues are items affecting the policies, procedures, or technical requirements of the SUBSAFE Program, as delineated by this manual. Issues may be initiated by individual program participants or by collective action, such as through SSWG meetings, and may involve either the clarification of existing requirements or the modification of existing requirements. SUBSAFE Program issues shall be forwarded to NAVSEA 92Q, who is responsible for ensuring that all items are thoroughly reviewed and evaluated by the cognizant codes. The SSSTG shall resolve all items affecting SUBSAFE Program policy, and any item where a consensus position is not reached by the cognizant codes.

3.2.1 PROCESS FOR CHANGING THE SUBSAFE MANUAL.

3.2.1.1 CHANGE SUBMITTAL.

Recommended changes to this manual shall be documented on the SUBSAFE Manual Change Request Form, Figure A-1 in Appendix A, and shall be submitted to NAVSEA 92Q for resolution. Change requests shall include specific recommended change wording, with detailed rationale or justification. References to this manual shall utilize the referencing methodology of paragraph 1.7. Change requests shall also identify known impacts of the recommended change upon related reference documentation.

3.2.1.2 CHANGE APPROVAL.

Changes to this manual impacting SUBSAFE Program policies, procedures, and technical requirements will normally be signed out by NAVSEA 92. Editorial changes may be signed out by NAVSEA 92Q. Approved MCRs shall not be invoked until they have been issued as part of an approved change to the SUBSAFE Manual.

3.2.1.3 CHANGE PROMULGATION.

Changes shall be promulgated by NAVSEA 92Q. Each change shall be accompanied by a promulgation letter which cites the specific purpose of the change and the instructions for carrying it out. Each change will be issued as either a Revision (REV), a Change (CHG), or an Advance Change Notice (ACN) as discussed below:

a. Revision (REV). A Revision shall be used when the total number of changed pages is 50% or more of the total manual pages. Revisions shall be identified by letter in alphabetical sequence (e.g., NAVSEA 0924-062-0010, Rev B). Each revision is a complete re-publication. It shall absorb all Changes and Advance Change Notices that have been generated since the last revision.

b. Change (CHG). A Change shall be used when the volume of changed pages is between 5% and 50% of the total manual pages. Changes shall be numbered consecutively, beginning with Change 1 (e.g., NAVSEA 0924-062-0010, Rev A (CHG 1)). A Change shall absorb all Advance Change Notices issued since the last change.

c. Advance Change Notice (ACN). An ACN shall be used when the volume of changed pages is less than 5% of the total manual pages. ACNs shall be assigned a two-part number. The first part shall identify the next change into which the ACN will later be incorporated if not absorbed by a revision. The second part shall identify the sequential number of the ACN (e.g., NAVSEA 0924-062-0010, Rev A, (CHG 1) (ACN 2-1)).

3.2.1.4 CHANGE STATUS ACCOUNTING.

A master change status accounting system shall be maintained by NAVSEA 92Q to track all requests for proposed changes to the SUBSAFE Requirements Manual. As a minimum, the system shall identify the item and shall contain the review status, evaluation comments, and resulting action.

3.2.1.5 SUBSAFE REQUIREMENTS MANUAL DISTRIBUTION.

As custodian of the SUBSAFE Requirements Manual, NAVSEA 92Q maintains control over its distribution. To ensure adequate distribution and change management, the names, codes, and activities of authorized manual holders, by copy number, will be reported to NAVSEA 92Q, as solicited. Requests for additional or replacement copies of the manual, with supporting justification, should be directed to NAVSEA 92Q. Manual requests from fleet activities shall be submitted via the TYCOM. Manual requests from private contractors shall be submitted via their government sponsor.

SSG 24B

3.2.2 PROCESS FOR OBTAINING CLARIFICATION ON SUBSAFE ISSUES.

3.2.2.1 REQUEST SUBMITTAL.

Requests for clarification of SUBSAFE policies, procedures, or technical and administrative requirements shall be forwarded to NAVSEA 92Q for resolution. Members of the SSWG should use the SUBSAFE Liaison Action Request, detailed in paragraph 3.3, as the vehicle for presenting issues. All other parties should submit their issues to NAVSEA 92Q using a formal, serialized form of correspondence. In all cases, these submittals shall utilize the methodology of paragraph 1.7 when making reference to this manual and shall include sufficient detail to clearly identify the issue being addressed.

3.2.2.2 REQUEST STATUS ACCOUNTING.

A master status accounting system shall be maintained by NAVSEA 92Q to track all requests for clarification of SUBSAFE Program issues. As a minimum, the system shall identify the item and shall contain the review status, evaluation comments, and resulting action.

3.3 SUBSAFE LIAISON ACTION REQUEST (SS LAR) SYSTEM.

In order to provide an efficient and rapid means of communicating on SUBSAFE related issues, a computer automated SS LAR program was developed. The program allows for direct written communication between Submarine Safety Working Group (SSWG) members and NAVSEA 92Q on any SUBSAFE Program issue. SSLARs shall not be used in lieu of MCRs to propose changes to the SUBSAFE Manual.

3.4 POLICY FOR ADMINISTERING NON-CONFORMANCES WITHIN THE SUBSAFE BOUNDARY. SSG 200D

A non-conformance is the method by which non-compliance with an applicable specification is requested, authorized, and documented. All non-conformances involving SUBSAFE systems or components shall be administered in accordance with NAVSEAINST 5400.95 (series) and the procedures specified below.

3.4.1 NEW CONSTRUCTION NON-CONFORMANCES. SSG 200D

For new construction, any non-conformance within the SUBSAFE boundary shall be adjudicated in accordance with the NAVSEA approved class drawing approval procedure or configuration management plan. The shipbuilder shall document the disposition of each non-conformance and send a copy of all approved non-conformances to the Design Yard/Planning Yard.

3.4.2 POST DELIVERY NON-CONFORMANCES. SSG 200D

For submarines after delivery, any non-conformance within the SUBSAFE boundary shall be administered in accordance with NAVSEA 0902-018-2010, General Overhaul Specifications for Deep Diving SSBN/SSN Submarines.

3.4.3 DEPARTURES FROM SPECIFICATIONS BY FORCES AFLOAT.

The Type Commander shall comply with the following procedures for processing departures within the SUBSAFE Boundary:

a. Forces Afloat departures are categorized as either MAJOR or MINOR in accordance with the Joint Fleet Maintenance Manual. Departures shall be approved as either PERMANENT or TEMPORARY conditions depending upon the degree of non-compliance and a technical determination of when the non-compliance must be corrected. PERMANENT departures of a recurring nature may be submitted to NAVSEA for approval as PRECEDENT setting to allow future processing as MINOR for departures that would otherwise be categorized as MAJOR.

b. The policy and technical authority for approval of Type Commander cognizant non-nuclear non-conformances by Naval Shipyard and Supervisor of Shipbuilding (SUPSHIP) Chief Engineers (CHENGs) is specified in NAVSEAINST 5400.95 (series).

3.4.3.1 PROCEDURES FOR PROCESSING DEPARTURES FROM SPECIFICATIONS. SSG 200D

The following procedures shall be followed by the Type Commander for processing departures within the SUBSAFE Boundary:

a. The following MINOR departures may be administered locally in accordance with the Joint Fleet Maintenance Manual:

(1) Departures to which a NAVSEA approved PRECEDENT setting departure clearly applies. The NAVSEA approved departure cited as the PRECEDENT shall be referenced and retained with the locally approved departure.

(2) Departures administered solely for the purpose of meeting the alternative accountability system requirement of paragraph 6.3.2.3 for at-sea testing.

b. The Type Commander shall review and evaluate all other requests for departures within the SUBSAFE Boundary. Each departure request shall be discussed with the designated NAVSEA technical authority, or regional CHENG per NAVSEAINST 5400.95 (series). Following agreement on MAJOR or MINOR categorization in accordance with Section 3.4.3.a, PERMANENT or TEMPORARY

condition designation, the time duration that a TEMPORARY non-compliance is technically acceptable, and any clarification of applicability of a previously approved PRECEDENT, the Type Commander shall:

(1) Obtain approval, by appropriate Technical Authority as allowed by NAVSEAINST 5400.95 (series), of all departures being evaluated for acceptance as PERMANENT.

(2) Approve departures being accepted as TEMPORARY, with the exception of URO/MRC related departures processed in accordance with paragraph 6.4. Departures approved as TEMPORARY shall specify the time duration that the non-compliance is acceptable prior to correction. Where operational necessity dictates departure approval prior to the above indicated discussion with NAVSEA, the Type Commander shall initiate this discussion at the earliest opportunity.

Documented discussions with NAVSEA constitute agreement that the SUBSAFE requirements of section 4.6 will be met. Any SUBSAFE Design Review requirements of paragraph 4.6.1 applicable to the non-compliance will be met by NAVSEA.

c. The Type Commander shall make final administrative approval or disapproval on all Forces Afloat departure requests.

d. The requesting activity shall initiate action to effect the appropriate software changes to reflect the approved departures.

3.4.4 NON-CONFORMANCES BY ENGINEERING AGENTS.

SSG 200D

All SUBSAFE non-conformances generated by or submitted to Engineering Agents shall be submitted to the appropriate NAVSEA program manager for approval. Engineering Agents can disposition SUBSAFE non-conformances locally provided they have received formal tasking of technical authority from NAVSEA.

3.4.5 OBJECTIVE QUALITY EVIDENCE REQUIREMENTS.

SSG 200D

Each activity shall maintain a copy of all non-conformance documentation in a form suitable for audit. NAVSEA shall perform a periodic audit of the documentation. The shipbuilder, Supervising Authority, and TYCOM shall maintain a listing (or computer data base equivalent) of all non-conformances for each hull. Non-conformances within the SUBSAFE boundary and the SUBSAFE Design Review Boundary, resulting in Technical Variance Documentation, shall be uniquely annotated on the non-conformance documentation and in the listing. This list shall contain, as a minimum, the following:

a. Serial Number
b. Short Title
c. Classification (MAJOR/MINOR)
d. Type of non-conformance (waiver, deviation)
e. Date Requested
f. Date Resolved
g. Approval or Disapproval Status
h. Conditional Approval Comments (if applicable)
i. SUBSAFE (Yes or No)
j. SUBSAFE Design Review (Yes or No)
k. Technical Variance Documentation (TVD) (Yes or No)

SSG 200D

3.4.5.1 DISTRIBUTION OF DEPARTURES FROM SPECIFICATIONS.

The Supervising Authority shall formally provide a copy of the hull specific

log of departures and of the approval sheets for each MAJOR departure to the applicable ship and TYCOM upon completion of new construction, PSA, SRA, ERP, or depot availability. Included in this listing shall be the status of pre-arrival departures authorized for correction during the PSA or depot availability. The Supervising Authority shall provide a copy of all non-conformances impacting URO/MRCs to SUBMEPP.

3.5 SUBSAFEGRAMs.

SUBSAFEGRAMs are used to provide timely dissemination of information concerning the SUBSAFE Program and provide written background, clarification and guidance regarding implementation of existing SUBSAFE Program requirements. SUBSAFEGRAMs also serve to identify and address significant or repetitive SUBSAFE deficiencies or problem areas. SUBSAFEGRAMs are not to be used to change requirements or circumvent the SUBSAFE Liaison Action Request or SUBSAFE Manual Change processes.

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SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

CHAPTER 4

SUBSAFE CERTIFICATION TECHNICAL REQUIREMENTS

4.1 PURPOSE.

Chapter 4 provides the minimum technical requirements to be satisfied before NAVSEA declares a submarine SUBSAFE certified and recommends that the ship be authorized for unrestricted operations to test depth. These requirements are the most current SUBSAFE requirements and are invoked for the design, construction, and maintenance of submarines. The cognizant NAVSEA program office should ensure that these requirements are invoked for the design, construction, and maintenance of submarines. Where design differences from one class to another prohibit common coverage, requirements are shown on a class basis.

4.2 DISCUSSION.

The SUBSAFE certification boundaries are identified in three discrete groups:

a. Hull Structure (Section 4.3).

b. Sea-connected/Seawater Systems (Section 4.4).

c. Non-seawater Piping and Mechanical SUBSAFE Systems (Section 4.5).

4.2.1 GROUP DESCRIPTIONS.

The three groups listed above contain all structure, components, and systems which are subject to SUBSAFE certification requirements. The following is a description of each of the three groups.

a. Hull Structure (Section 4.3). This section identifies all SUBSAFE hull structure, hull penetrations, and many of the major non-seawater systems which penetrate the pressure hull.

b. Sea-connected/Seawater Systems (Section 4.4). This section identifies the SUBSAFE systems which are open to sea during any non-casualty mode of operation.

c. Non-seawater Piping and Mechanical SUBSAFE Systems. (Section 4.5). This section identifies systems which are SUBSAFE because they are certified for safe operations to test depth but do not fit into either Section 4.3 or 4.4.

4.2.2 MANUAL FORMAT.

Paragraphs 4.2.2.1 through 4.2.2.3 below describe the format of Sections 4.3 through 4.5.

4.2.2.1 TITLE.

The item of structure, equipment/system, or component for which SUBSAFE requirements are being established.

4.2.2.2 BOUNDARY DEFINITION.

The boundary definition of each item of structure, equipment/system, or component contained in Sections 4.3 through 4.5 identifies the areas of the submarine which are subject to SUBSAFE certification requirements. Collectively, these boundaries constitute the SUBSAFE Certification Boundary. Those areas that fall outside of the SUBSAFE Certification Boundary are not required to meet the SUBSAFE certification requirements unless specifically stated herein (e.g., vital equipment).

4.2.2.3 SUBSAFE DESIGN REQUIREMENTS.

This section establishes the unique SUBSAFE design criteria, design review, and design configuration management/control requirements.

4.2.3 SUBSAFE REQUIREMENTS.

a. Section 4.6 provides specific technical details of requirements invoked in Sections 4.3, 4.4, and 4.5 and provides reference to applicable standards, specifications, and manuals required for the process of SUBSAFE certification.

b. Section 4.6 provides specific Objective Quality Evidence (OQE) requirements and provides reference to the applicable standards, specifications, and manuals which also require specific OQE (e.g., documentation, records) needed for initial SUBSAFE certification.

Appendix C is intended to be used as a basis for the development of paragraph 4.6.9.2 SUBSAFE Certification Audit Plan (SSCAP) and should be tailored during the design, construction and maintenance process to reflect any contractually invoked changes to specification required tests and inspections. Once this tailoring is complete and NAVSEA approval obtained, the SSCAP will define the minimum OQE requirements needed for both initial SUBSAFE certification and maintenance of SUBSAFE certification.

Appendix C provides examples of OQE necessary to assure compliance with contractually invoked SUBSAFE tests and inspections and should be used as a guide for provisioning deliverable data. All documentation required by standards and specifications should be obtained. If specifications provide an option for ordering documentation, the shipbuilder or maintenance activity shall obtain the OQE listed in Appendix C when ordering the material. Appendix C is not intended to be an all inclusive list of required OQE. This objective quality evidence shall be in a form suitable for audit.

c. For new construction, a SUBSAFE Certification Audit Plan (SSCAP) shall be furnished by NAVSEA to the shipbuilder as Government Furnished Information (GFI) in accordance with Section 5.5. The shipbuilder shall ensure that records are available for review during SUBSAFE Certification Audits (SSCAs). See Section 5.5 SSCAP requirements for maintenance availabilities. NAVSEA shall use the SSCAP to conduct the SSCAs.

4.2.4 CERTIFICATION.

All items within the SUBSAFE Boundary require System Certification. System certification items include certain fabrication control processes, material control processes, inspection processes, and SUBSAFE Design Review processes. Also included are certain system installation and testing requirements, operating manuals, selected record drawings, ship completion, and the sea trial agenda, satisfactory completion of which is critical to submarine safety. SUBSAFE Certification and objective quality evidence requirements are

located within Section 4.6 as defined within the referenced applicable standards, specifications, and manuals. The construction or installing activity shall review one hundred percent (100%) of the manufacturing, installation, and quality control records of all installed material within the hull integrity boundary to ensure that the material installed meets specification requirements and traceability exists when required by the invoked specification, standard, or drawing.

4.3 HULL STRUCTURE.

a. This section provides the boundary definitions and associated requirements for the following:

(1) Pressure Hull Structure (4.3.1).

(2) Missile Tubes (4.3.2).

b. For the items listed above, this section establishes the criteria to accomplish the purposes of the SUBSAFE Program as set forth in paragraph 1.1 of this manual. That is, they provide maximum reasonable assurance that applicable design, fabrication, testing, and certification requirements affecting or involved with hull structure systems have been complied with.

4.3.1 PRESSURE HULL STRUCTURE.

4.3.1.1 BOUNDARY DEFINITION.

That portion of the submarine structure which is designed to withstand the differential between internal atmospheric pressure and the collapse depth pressure of the submarine. The Pressure Hull Structure is comprised of the components identified in items a. through f. below:

a. Pressure hull plating (flat, cylindrical, conical, spherical, toriconical, and end closure bulkheads) and all associated framing, which includes portions of floors and containment bulkheads, all of which are support structure by design. When the Pressure Hull Structure Boundary is not designated on detail drawings of transverse floors and bulkheads that are designed as frames, then the first 18 inches off the pressure hull plating, measured normal to the ship axis from the surface to which the floor or bulkhead is attached is to be considered as Pressure Hull Framing. When frames have nominal depths greater than 18 inches, and transition into floors or bulkheads, only the nominal depth of the frame in way of the floors or bulkheads, is considered as Pressure Hull Framing.

b. Plating and framing for all hard tanks open to sea below 200 feet in any non-casualty mode of operation, including their manhole covers and coamings. Specifically excluded are those hard tanks which act as vented reservoirs and can be isolated from the differential between sea pressure and internal atmospheric pressure by a double boundary (i.e., hull and backup valve or equivalent).

c. Plating and framing for the sonar sphere and sonar sphere tunnel when their pressure structure is continuous to the pressure hull plating.

d. Inserts, sea chests, penetrations, sleeves, and liners associated with items a., b., and c. above, including pressure hull penetrations in hard tanks and the sonar sphere.

e. Stern tube(s) when exposed to test depth pressure differential.

f. All structural materials in the access/loading/lockout/escape trunks that penetrate the pressure hull and are designed to withstand the differential between internal atmospheric pressure and the collapse depth pressure of the submarine. (See Section 4.4.1.1.3 for requirements on piping and components which penetrate the trunks.) This includes all plating, hatches, and those portions of the inboard and outboard closure, and locking devices which may be subject to submergence pressure, associated framing which acts as support structure, and associated inserts, penetrations, and liners.

4.3.1.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to Pressure Hull Structure are as specified in Section 4.6.

4.3.2 MISSILE TUBES.

4.3.2.1 BOUNDARY DEFINITION.

That portion of a missile tube that penetrates the pressure hull, extends outboard of the pressure hull molded lines, and is designed to withstand the differential between internal atmospheric pressure and collapse depth pressure. This includes the muzzle hatch and the associated gaskets, o-rings, and packings. The operating shafts shall be controlled by Section 4.5.12. Section 4.3.1 provides the requirements for the pressure hull insert.

4.3.2.2 SUBSAFE DESIGN REQUIREMENTS.

Analysis in accordance with methods and procedures approved by NAVSEA shall be conducted on missile tube structure that is designed to withstand collapse depth pressure.

4.3.2.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the missile tubes and their hatches are as specified in Section 4.6.

4.4 SEA-CONNECTED/SEAWATER SYSTEMS.

a. This section provides the boundary definitions and associated requirements for sea-connected and seawater piping systems. For these systems, this section establishes the criteria to accomplish the purposes of the SUBSAFE Program as set forth in paragraph 1.1 of this Manual. That is, they provide maximum reasonable assurance that:

(1) System watertight integrity, structural integrity, and operation are proven and maintained to minimize the probability of a flooding casualty.

(2) The submarine can recover from a specified flooding casualty, should such a casualty occur.

b. Sea-connected and seawater piping systems fall into four categories:

(1) Circulating seawater operated at depths greater than 200 feet in any non-casualty mode of operation (e.g., Main Sea Water System).

(2) Circulating seawater operated at depths of 200 feet or less (e.g., Diesel Sea Water System).

(3) Non-circulating sea-connected operated at depths greater than 200 feet in any non-casualty mode of operation (e.g., Plumbing, Trim and Drain, Emergency Main Ballast Tank (EMBT) Blow Systems).

(4) Non-circulating sea-connected operated at depths of 200 feet or less (e.g., Diesel Exhaust System).

c. Section 4.4 provides the boundary definitions and associated requirements for the following:

(1) General Sea-connected and Seawater Piping Systems (4.4.1).

(2) Emergency Main Ballast Tank (EMBT) Blow System (4.4.2).

4.4.1 GENERAL SEA-CONNECTED AND SEAWATER PIPING SYSTEMS.

The following systems are examples of systems covered by this section:

a. Main Sea Water (MSW) System.

b. Auxiliary Sea Water (ASW) System.

c. Shaft Seal Water System.

d. Diesel Sea Water System.

e. Trim and Drain System (Including Auxiliary and Gravity Drain Systems).

f. Plumbing System.

g. Depth Sensing and Capacity Gage System.

h. Fuel Oil and Compensating Water System.

i. Hovering and Depth Control System.

j. Desalination Systems.

k. Snorkel Induction and Diesel Exhaust System.

l. Service Air System.

m. Carbon Dioxide Removal System.

n. Hydrogen Overboard Discharge System.

o. Salvage Air System.

p. Low Pressure Blow System.

q. Arctic Blow System.

r. Missile Compensating Water System.

s. Missile Gas System.

t. Vertical Launch - Flood and Drain System.

u. Vertical Launch - Missile Tube Pressurization and Vent System.

4.4.1.1 BOUNDARY DEFINITION.

4.4.1.1.1 GENERAL BOUNDARY DEFINITION (SSN 688 CLASS AND LATER).

a. The piping system and components, NPS 1/2 or larger, from and including the inboard joint of the backup valve outboard to the hull or hull equivalent (e.g., Shaft Seal Housing).

b. The piping system and components, NPS 4 or larger, inboard from the inboard joint of the backup valve that are open to sea below 200 feet in any non-casualty mode of operation. NPS 4 or larger components are excluded when connected to the sea by piping less than NPS 4.

c. For the sea chest blow, where a check valve or check feature is installed either in or inboard of the backup valve, the inboard joint of the check valve or the valve in which the check feature is installed shall be used to terminate the boundary.

d. Open-ended vent and drain piping from the downstream joint of the last normally shut valve is excluded from the boundary.

e. For hull and backup valves which solely serve one or more hard tanks excluded from the boundary by paragraph 4.3.1.1b and which provide positive shut-off from the sea, the boundary shall not extend inboard from the inboard joint of the backup valve.

f. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

g. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.4.1.1.2 GENERAL BOUNDARY DEFINITION (PRE-SSN 688 CLASS).

a. The piping system and components, NPS 1/2 or larger, from and including the inboard joint of the backup valve outboard to the hull or hull equivalent (e.g., Shaft Seal Housing).

b. The piping system and components, NPS 1/2 or larger, inboard from the inboard joint of the backup valve that is open to sea below 200 feet in any non-casualty mode of operation. NPS 1/2 or larger components are excluded when connected to the sea by piping less than NPS 1/2. For sea-connected systems where a check valve or check feature is installed, either in or inboard of the backup valve, the inboard joint of the check valve or the valve in which the check feature is installed shall be used to terminate the boundary.

c. For the sea chest blow, where a check valve or check feature is installed, either in or inboard of the backup valve, the inboard joint of the check valve or the valve in which the check feature is installed shall be used to terminate the boundary.

d. Open-ended vent and drain piping from the downstream joint of the last normally shut valve is excluded from the boundary.

e. For hull and backup valves which solely serve one or more hard tanks excluded from the boundary by paragraph 4.3.1.1b and which provide positive shut-off from the sea, the boundary shall not extend inboard from the inboard joint of the backup valve.

f. Where a hull valve solely serves a hard tank and the valve inboard of the hull valve does not provide positive shut-off from the sea, the backup valve shall be the first valve inboard of the hard tank that provides positive shut-off from the sea.

g. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

h. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be

controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.4.1.1.3 SPECIFIC SYSTEM BOUNDARY CLARIFICATIONS.

The following definitions apply to all classes, where applicable, and are based on current standard and future anticipated system configurations:

a. Trim and Drain System (Including Auxiliary and Gravity Drain Systems).

(1) The piping system and components, NPS 1/2 or larger, which penetrate a trunk (e.g., Logistics and Escape Trunks) or hull integrity boundary (e.g., Torpedo Tubes), inboard of the hull closure, from and including the inboard joint of the first valve inboard of the penetration outboard to the trunk or hull integrity boundary.

(2) When specifically approved by NAVSEA, a design approved check valve may be installed as close to the applicable backup valve as feasible to establish an inboard boundary in piping systems NPS 4 and smaller.

b. Plumbing System.

The piping system and components, NPS 1/2 or larger, which terminate within a trunk (e.g., shore service), from the inboard joint of the penetration outboard to and including the cap.

c. Service Air System.

(1) The piping system and components, NPS 1/2 or larger, which terminate within a trunk (e.g., shore service), from the inboard joint of the penetration outboard to and including the cap.

(2) The piping system and components, NPS 1/2 or larger, which penetrate a trunk or hull integrity boundary, inboard of the hull closure, from and including the inboard joint of the first valve inboard of the penetration outboard to the trunk or hull integrity boundary.

d. Salvage Air System.

The piping system and components, NPS 1/2 or larger, from and including the salvage cap, inboard to and including the inboard joint of the backup valve. For clarification, the salvage cap is defined as the hull valve, and the salvage valve is defined as the backup valve.

e. Missile Compensating Water System.

(1) The piping system and components, NPS 1/2 or larger, from and including the inboard joint of the backup valve outboard to the hull for ships with compensating tanks.

(2) The inboard joint of the hull valve outboard to the hull is the boundary for ships with a compensating valve in the missile tube.

f. Missile Gas System.

The piping system and components, NPS 1/2 or larger, from and including the inboard joint of the backup valve outboard to the hull. Caps for the piping system penetrations in the shore service trunks are excluded.

g. Vertical Launch - Missile Tube Pressurization and Vent System.

The piping system and components, NPS 1/2 or larger, from and including the inboard joint of the first valve inboard of the hull penetration outboard to the hull.

4.4.1.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements are as specified in Section 4.6. The specific Emergency Flood Control Hydraulic System requirements are as specified in Section 4.5.1.

4.4.2 EMERGENCY MAIN BALLAST TANK (EMBT) BLOW SYSTEM.

4.4.2.1 BOUNDARY DEFINITION.

The EMBT blow boundary, regardless of size, shall include:

a. The high pressure air flasks designated for EMBT blow (hereafter referred to as EMBT blow flasks).

b. Inboard and outboard piping from EMBT blow flasks to and including the open-ended piping in the main ballast tanks.

c. All EMBT blow piping up to and including the first isolation valve of any connected system.

d. The Actuating Air System including:

(1) The actuating air flask(s).

(2) The piping from the actuating air flask(s) up to and including the first valve off the high pressure air header.

(3) The piping from the actuating air flask(s) up to and including the EMBT blow valve actuators.

e. All pressure containing instrumentation necessary to monitor or operate the EMBT Blow System.

f. Open-ended vent and drain lines from the downstream joint of the last valve are excluded from the boundary.

4.4.2.2 SUBSAFE DESIGN REQUIREMENTS.

a. The EMBT Blow System shall, as a minimum, provide submarine recovery capabilities sufficient to surface from a flooding casualty under the following conditions:

(1) A single pipe rupture resulting in flooding equivalent to a 4 inch diameter hole in the hull having a discharge coefficient equal to 1.0.

(2) Ship at test depth, neutral buoyancy, and zero trim at time of casualty.

(3) Flooding occurs in the engine room.

(4) Pressure in all EMBT blow flask air banks serving the EMBT Blow System is +0 PSI, -200 PSI of the nominal operating pressure at time of the casualty.

(5) Control surfaces are on zero at the time of casualty and remain on zero during the recovery evolution.

(6) Ship speed is five knots immediately before the casualty occurs.

(7) Propulsive power is lost immediately after the casualty occurs.

(8) EMBT blow actuation is initiated at the Ballast Control Panel (BCP) 15 seconds after casualty occurs.

(9) Flooding is:

(a) secured 90 seconds after casualty occurs, for pre-SSN 688 Classes.

(b) non-securable, continuing throughout the recovery evolution, for SSN 688 and later classes.

(10) No part of the ship exceeds collapse depth during the recovery evolution.

(11) The ship is considered surfaced when any part of the pressure hull broaches the surface.

b. The EMBT Blow System shall provide short, direct flow paths from the EMBT blow air flasks to the main ballast tanks. The shock wave effects of high velocities should be considered in the design of the EMBT blow arrangement. The system shall be designed with the minimum number of components. All components shall be readily accessible for operation and maintenance. It shall contain no strainers, orifices, restrictions, and/or filters unless specifically approved by NAVSEA. The EMBT Blow System shall be operationally independent of any other MBT Blow System or high pressure air source.

c. The EMBT Blow System shall be designed to provide the minimum change in pitch angle of the ship as it ascends when the system is actuated at test depth under no-flooding conditions and at 5-knot speed.

d. An emergency blow valve shall be installed in each emergency blow circuit. The emergency blow valve shall be operable by a local manual override regardless of position of its control valve in the control room, and position indication shall be provided at the Ballast Control Panel (BCP) or its equivalent. The blow valves shall fail in the "as is" position. The blow valves shall be operable with a minimum actuation air pressure of 1000 PSI with the nominal operating bank pressure applied to the air bank side of the EMBT blow valve.

e. The EMBT blow valves shall be actuated by high pressure actuating air controlled by manually operated control valves located on the BCP, or within easy reach of the BCP operator. The control valves shall be oriented so that the handle will be positioned upward to open the emergency blow valves. One control valve shall be provided for the actuation of the blow valves aft and one control valve for the actuation of the blow valves forward. Dedicated air flask(s) shall be provided for EMBT actuation air. The flask(s) shall be continuously supplied by the HP Air System via a locked-open stop valve, check valves and filter without a bypass feature, and a double-valved drain line. The volume of the air flask(s) shall be sufficient to provide for four operating cycles (shut to open to shut) of all emergency blow valves. An air flask of non-corrosive material shall be provided to serve as a backup source of compressed air to the control valves to actuate the blow valves in the event of a failure of the High Pressure Air System. A pressure gage shall be provided in the air supply line to the actuating valves. The actuating air line joints shall be welded.

f. Solenoid valves shall not be located within the direct flow path of the EMBT Blow System. Solenoid valves in existing EMBT Blow Systems which connect the EMBT blow flask banks to the ship's high-pressure air system shall fail shut upon loss of electrical power, except the valve for the one bank serving the ship's service system, which shall fail open.

g. The MBT flood holes shall be sized in conjunction with the allowable stress of the MBT structure.

h. The EMBT blow vent-check valves shall be installed in horizontal pipe runs. The check housing shall be oriented at least 10 degrees above the horizontal plane when viewed from the valve inlet.

i. For each class of ships, a complete EMBT Blow System diagram shall be provided, including a listing of all components and valves to be used, and submitted to NAVSEA for approval. Individual ship diagrams which differ from the NAVSEA approved class diagram configuration/components shall also require NAVSEA approval.

j. The port and starboard EMBT blow piping shall be cross-connected downstream of the EMBT blow valves. Piping to each main ballast tank shall include a combined vent-check valve and a stop valve at the pressure hull. The stop valves shall be installed so that in case of casualty to any Main Ballast Tank, the valve can be shut to prevent escape of air when blowing other tanks where more than one tank is supplied from the same blow line.

k. An automatic drain valve with manual bypass feature shall be installed at the low point of the blow piping between the combination vent-check valve and the EMBT blow valve so that any leakage past the vent check valves will be drained by the automatic drain valve.

l. Calculation of system blow rates, forward and aft blow rate distribution, and EMBT blow flask bank capacity of each design or design change shall be accomplished using NAVSEA approved design methods and procedures and shall be forwarded to NAVSEA for approval.

m. For the first ship of the class and for alterations that could affect ship recovery, calculations for ship recovery from flooding casualties shall be accomplished and submitted to NAVSEA for approval.

n. Flexible connectors shall not be installed.

4.4.2.3 EMERGENCY MAIN BALLAST TANK (EMBT) BLOW SYSTEM TEST REQUIREMENTS.

4.4.2.3.1 DOCKSIDE/DRYDOCK EMBT BLOW SYSTEM TEST AND INSPECTION FOR ORIGINAL INSTALLATIONS, MAJOR MODIFICATION, OR WHEN DIRECTED BY NAVSEA.

Dockside/Drydock Tests Following EMBT Blow System Modifications. Where work accomplished on the EMBT Blow System included modifications such as accomplishing a SHIPALT involving major changes in either piping or components, any one of which could have a significant effect on the existing system performance (blow rate and blow rate distribution), the EMBT System shall be tested, evaluated and reported in accordance with the following procedures:

4.4.2.3.1.1 TEST PROCEDURE.

This test may be conducted with the ship waterborne or non-waterborne if testing has demonstrated that results are comparable and are approved by NAVSEA. The EMBT Blow System shall be tested to demonstrate proper operation by the following:

a. Verify EMBT blow actuation as follows:

(1) Operate each EMBT blow valve with the local manual operator and then remotely from the BCP.

(2) With the emergency actuating air flask(s) charged to nominal operating pressure and the EMBT blow flasks charged to +0, -200 PSI of nominal operating pressure, demonstrate the capability of the emergency actuating air flask(s) to provide four operating cycles of all EMBT blow valves.

(3) For the final cycle, with the emergency actuating air flask(s) pressurized no greater than 1000 PSI and the EMBT blow flasks charged to +0, -200 PSI of nominal operating pressure, demonstrate the capability of the emergency actuating air flask(s) to provide one cycle of all EMBT blow valves.

b. Charge EMBT blow flask(s) and actuating air flask(s) and conduct EMBT blows as follows:

(1) Charge all of the EMBT blow flask banks that supply air to the EMBT Blow System to +0, -200 PSI of nominal operating pressure. Operate drain blow down line of each air bank to ensure that residual condensate in the bank is adequately drained. Determine the dew point of the air for each bank. Ensure dew point reading is -40°F or better at one ATM before proceeding with blow test.

NOTE

-40°F at one ATM is an allowable dew point for testing only. A dew point of -60°F at one ATM is required before going to sea.

(2) Discharge all but residual water from the MBTs, using the Low-Pressure Blow System.

(3) Line up the EMBT Blow System to ensure maximum flow of air to all ballast tanks.

(4) Initiate EMBT blow by operating the actuating valves at the Ballast Control Panel and continue to blow until the EMBT blow flask bank pressure in any one bank is less than 1000 PSI.

(5) For new construction, recharge the EMBT blow flask banks and actuating air flask(s) and repeat the test to verify repeatability.

4.4.2.3.1.2 INSTRUMENTATION AND DATA RECORDING.

For original installation, instrumentation to measure continuous EMBT Blow flask bank pressure shall be installed in all banks. For major modification, only the affected EMBT Blow flask banks shall be instrumented.

a. For both original installation and major modification, the following data shall be recorded continuously as a function of time:

(1) EMBT blow flask bank pressures and temperatures immediately prior to blow.

(2) EMBT blow flask bank pressures continuously during the blow.

(3) EMBT blow flask bank pressures upon completion of the blow.

(4) EMBT blow flask bank pressure and temperature for each bank 15 minutes after completion of the blow test.

(5) EMBT blow flask bank pressure for each bank two hours after completion of the blow test and every hour thereafter until two (2) consecutive readings within ± five percent (5%) are obtained.

(6) Operating times for EMBT Blow System valves.

b. A test report shall be forwarded to NAVSEA or the Supervising Authority, as appropriate, for approval within 30 days of test accomplishment. The report shall include:

(1) A summary of all test data.

(2) The EMBT blow rate for each EMBT blow flask bank instrumented, as determined using the procedure described in NAVSEA Drawing 803-6397299, EMBT Blow Rate Calculation Procedure. This calculated blow rate shall be compared with the design blow rate determined by a NAVSEA approved procedure developed in accordance with item 1. of paragraph 4.4.2.2.

c. An evaluation and certification of satisfactory dockside/drydock EMBT Blow System tests shall be forwarded to NAVSEA or the Supervising Authority, as appropriate, for approval prior to Fast Cruise.

4.4.2.3.2 AT-SEA EMBT BLOW SYSTEM TEST, ORIGINAL INSTALLATION OR WHEN DIRECTED BY NAVSEA.

An at-sea test of the EMBT Blow System shall be conducted in accordance with the applicable NAVSEA approved test program. The NAVSEA approved test program for the first ship of the class built at each shipyard (or when directed by NAVSEA) shall require a maximum of six EMBT blow tests, with a maximum blow time of 15 seconds during any test. The test depth EMBT blow shall be conducted the first time test depth is achieved or as otherwise approved by NAVSEA.

CAUTION

If the submarine should roll more than 15 degrees during the blow test (either surfaced or submerged), NAVSEA direction shall be obtained prior to further submerged operations.

a. The following data shall be recorded continuously by automatic recorder as a function of time, from 15 seconds before the initiation of the blow until after broach:

(1) Depth.

(2) Ship speed.

(3) EMBT blow valve position.

(4) Actuator valve position.

(5) Roll angle.

(6) Pitch angle.

(7) Course.

(8) Rudder angle.

(9) Fairwater/bow plane angle.

(10) Stern plane angle.

b. The above data shall be reduced and tabulated at one second intervals. EMBT blow flask bank pressures shall be recorded before and 15 minutes after the blow. The Supervising Authority shall review and certify that the tests meet the minimum design acceptance requirements. Within two months after completion of at-sea testing, the following data shall be forwarded to NAVSEA:

(1) A copy of the original recordings, properly identified and calibrated.

(2) A copy of the reduced and tabulated sea trial data, including EMBT blow flask bank pressure data.

c. The NAVSEA approved Test Program for follow ships of the class at each shipyard shall require a maximum of four EMBT blow tests, with a maximum blow time of 15 seconds during any test. The test depth EMBT blow shall be conducted the first time test depth is achieved. The following data shall be recorded at 15-second intervals from the initiation of the blow until after broach:

(1) Depth.

(2) Ship speed.

(3) Pitch angle.

(4) Roll angle.

(5) Course.

d. EMBT blow flask pressures shall be recorded before and 15 minutes after the blow. Operating times for the blow and actuating valves shall be noted. Maximum values of roll and pitch, together with their respective times of occurrence, shall be noted.

e. The cognizant supervising authority shall review the data and certify that minimum design acceptance requirements have been adequately demonstrated by the performed tests. Within two months of completion of at-sea testing, a copy of the above sea trial data shall be forwarded to NAVSEA.

4.4.2.3.3 DOCKSIDE/DRYDOCK EMBT BLOW SYSTEM TESTS FOLLOWING ROUTINE MAINTENANCE AND REPAIR WORK.

Where work done on the EMBT Blow System consisted of routine repairs, cleaning, and testing such that the blow rate or distribution is not affected, the EMBT Blow System shall be tested to demonstrate proper operation of the system. At a minimum, conduct the remote static blow in accordance with the applicable portions of URO/MRC 022(Dockside Operation of EMBT Blow System Valves and Piping) to retest those portions of the system affected by the work.

4.4.2.3.4 AT-SEA EMBT BLOW SYSTEM TESTS FOLLOWING OVERHAUL/MAJOR DEPOT AVAILABILITY OR WHEN DIRECTED BY NAVSEA.

Two EMBT Blow System tests are required in accordance with the table below. The test depth EMBT blow shall be conducted the first time test depth is achieved.

CAUTION

If the submarine should roll more than 15 degrees during the blow test (either surfaced or submerged), NAVSEA direction shall be obtained prior to further submerged operations.

a. The post-overhaul tests and initial conditions are:

Class	Initial Speed	Initial Depth		Duration** of Blow
		Blow #1	Blow #2	
SSN 640 CL	8-10 kts.	200 ft-0.7 T.D	T.D. *	10-15 sec.
AGSS 555	7.5 kts.	0.1-0.2 T.D.	T.D. *	5-10 sec.
SSN 637, 683, 671, 688 CL	10 kts.	200 ft-0.7 T.D.	T.D. *	10-15 sec.
SSBN 726 CL	10 kts.	200 ft-0.7 T.D.	T.D. *	10-15 sec.
SSN 21 CL	10 kts.	200 ft-0.7 T.D.	T.D. *	10-12 sec.
SSN 774 CL	10 kts.	200 ft-0.7 T.D	T.D. *	10-15 sec.
Future Submarine Design	10 kts.	200 ft-0.7 T.D.	T.D. *	10-15 sec.

* The test depth requirement will be satisfied by a test from the maximum depth allowed by the ship's Submerged Operating Envelope (SOE) at the initial speed required.

** Blow duration is the time interval between initiation and termination of the blow from the Ballast Control Panel (BCP).

b. The submarine should be at approximately neutral buoyancy and level trim at the start of each test.

c. Use rudder as necessary to maintain course, avoiding the use of large rudder angles.

d. Maintain constant throttle setting during each test.

e. During all tests, commencing with the initiation of the blow, the submarine shall attempt to attain and keep a rise pitch angle of between 10 and 20 degrees until broach.

f. EMBT blow flask air bank and actuating air flask(s) pressures at the start of each test shall be +0 PSI, -200 PSI of nominal operating pressure.

4.4.2.4 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the EMBT Blow System are as specified in Section 4.6.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5 NON-SEAWATER PIPING AND MECHANICAL SUBSAFE SYSTEMS.

a. This section provides the boundary definitions and associated requirements for non-seawater piping and mechanical SUBSAFE systems. For these systems this section establishes the criteria to accomplish the purposes of the SUBSAFE Program as set forth in paragraph 1.1 of this Manual. That is, they provide maximum reasonable assurance that:

(1) System watertight integrity, structural integrity, and operation are proven and maintained to minimize the probability of a flooding casualty.

(2) The submarine can recover from a specified flooding casualty, should such a casualty occur.

b. Section 4.5 contains the following SUBSAFE systems.

(1) Sea-connected Emergency Flood Control System (4.5.1).

(2) Ship Control (4.5.2).

(3) Main Propulsion Shaft (4.5.3).

(4) Shaft Seal/Seal Housing (4.5.4).

(5) Trash Disposal Unit (4.5.5).

(6) Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher (4.5.6).

(7) Torpedo Tubes and Ejection Pump (4.5.7).

(8) Outboard Grease System (4.5.8).

(9) Electrical Hull Fittings (EHFs) (4.5.9).

(10) Periscopes and Antennas (4.5.10).

(11) Towed Sonar Array/Floating Wire Antenna Valve Stacks (4.5.11).

(12) Solid Shafts that Penetrate the Pressure Hull (4.5.12).

(13) Secondary Propulsion Motor (SPM) Column (4.5.13).

(14) Non-sea-connected Piping Systems which Penetrate the Pressure Hull (4.5.14).

(15) Other pressure hull penetrators/fittings (4.5.15).

4.5.1 SEA-CONNECTED EMERGENCY FLOOD CONTROL SYSTEM.

4.5.1.1 BOUNDARY DEFINITION.

a. The piping system, regardless of size, from and including the upstream joint of the hydraulic supply header isolation check valve downstream to, and including, the hydraulic actuator where failure would result in loss of emergency remote power operation.

b. The piping system, regardless of size, from and including the upstream joint of the emergency flood control hydraulic accumulator air charging isolation valve downstream to, and including, the accumulator where failure would result in loss of the accumulator air charge.

c. Any mechanical linkage between the actuator and the component being operated, when the actuator is not mounted directly on the component being operated, whose failure would result in loss of emergency remote operation.

4.5.1.2 SUBSAFE DESIGN REQUIREMENTS.

a. The purpose of this section is to establish requirements for remote seawater valve control to secure flooding in the event of rupture in a sea-connected piping system that is open to sea below 200 feet in any non-casualty mode of operation. Control shall be exercised from centrally located manned flood control stations over as many major seawater valves as possible without denying main propulsion capability. The following assumptions were made in conducting studies and developing requirements:

(1) Evaluation is predicated on a single casualty concept.

(2) Only piping penetrations are considered; shaft, mast, and electrical hull penetrations are excluded.

(3) Where manual operation is specified, power operation may be substituted for reasons other than flooding control.

b. Emergency hydraulic power closure capability from a remote flood control station shall be provided for the following sea-connected components, except as specified in item d. below:

(1) Hull valves and flooding control valves NPS 1 and larger.

(2) Backup valves NPS 4 and larger.

(3) Trash Disposal Unit (TDU) muzzle door or valve.

(4) Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher (or equivalent) muzzle door or valve.

(5) Torpedo tube muzzle doors.

c. Emergency hydraulic power open and shut capability from a remote flood control station shall be provided for the Main Sea Water System hull and backup valves with the exception of the continuous vent backup valves.

d. Emergency hydraulic operation is NOT required for the following:

(1) Any seawater/sea-connected system which is not open to sea below 200 feet in any non-casualty mode of operation.

(2) Main ballast tank blow hull valves.

(3) Hull valves and flooding control valves less than NPS 4 which are continuously manned when open. Valves in this category, however, shall have manual operators located as to avoid direct impingement on personnel and equipment from a rupture in that system.

(4) Main ballast tank vent valves.

(5) Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher breech door, torpedo tube breech doors, and TDU breech door do not require emergency remote power closure capability. Valves inboard of the torpedo tube (including torpedo tube drain valves), TDU, and internal countermeasure launcher, signal ejector, and internal auxiliary launcher muzzle doors require no remote power operation for certification in view of their being shut and interlocked when the outer door is open or of their small size and being continuously manned when the muzzle door is open.

(6) Main coolant discharge, steam generator relief, and blowdown overboard discharge valves.

e. Emergency Flood Control Hydraulic System remote flood control stations shall meet the following:

(1) One station shall be provided in each compartment or major subdivision to operate all valves or closures requiring emergency hydraulic operation in that area.

(2) Each station shall be located clear of the direct impingement of water from a rupture in the systems it operates.

(3) Normal remote control operators for sea valves shall be grouped in as few groups as possible and separated from the flooding control stations to reduce the possibility of a casualty preventing access to both flooding control and normal operating stations.

(4) The engine room station shall be located in the maneuvering control space (room).

(5) Each station, with the exception of the engine room flood control station, shall use one lever to operate all associated valves or closures. The engine room flood control station shall use the minimum number of levers required to permit split plant operation of the main propulsion plant.

(6) Each station operating lever that opens Main Sea Water hull and backup valves shall be capable of being pin-locked in the remote power shut position only.

f. Emergency flood control hydraulic operation accumulators for MSW hull and backup valves shall be sized to accomplish at least one full valve operating cycle (open-to-shut-to-open). Accumulators for all other valves (or closures) shall be sized to accomplish at least one half valve operating cycle (open-to-shut).

g. A hull valve (or closure) and its corresponding backup valve (or closure) shall not be supplied by the same flood control accumulator.

h. The design of Emergency Flood Control Hydraulic System valves, actuators, operators, and accumulators shall be approved by NAVSEA.

i. Flexible connectors shall not be installed.

j. The Sea-connected Emergency Flood Control Hydraulic System shall be provided by a dedicated stored energy system or, when approved by NAVSEA, by a dual independent source power supply, one for the hull valve and the other for the backup valve.

k. Remote closure hydraulic supply criteria:

(1) In the Engine Room of nuclear submarines, provide one accumulator for hull valves and other flooding control valves and one accumulator for backup valves. Standard size Navy hydraulic accumulators, qualified for submarine service, shall be used except as specifically approved by NAVSEA on a case basis.

(2) In portions of the ship other than the Engine Room of nuclear submarines, hull valves and hull closures requiring emergency remote closure shall be supplied by flooding control accumulators, in addition to supply from one of the ship service hydraulic supply headers.

l. Where both a hull valve and its associated backup valve are provided with emergency remote closure, a single hydraulic casualty shall not result in the loss of emergency remote power closure for both the hull valve and its associated backup valve.

m. Remote power operation shall not be used for high pressure air Main Ballast Tank blow hull valves.

n. Only energy from the ship’s hydraulic system shall be used for emergency power operation, except as otherwise specified. This is not intended to preclude the use of independent accumulators where installed for backup.

o. For each class of ships, a complete sea water valve control system diagram shall be provided, including a listing of all valves and components to be used, and submitted to NAVSEA for approval. Individual ship diagrams, developed because of differences from the class, shall also require NAVSEA approval.

4.5.1.3 SEAWATER VALVES AND CLOSURES CHARACTERISTICS.

4.5.1.3.1 OPERATIONAL CHARACTERISTICS.

a. Valves and closures identified in items (1) through (4) of paragraph 4.5.1.2b. shall be capable of being shut at all depths down to collapse depth under conditions resulting from the most serious rupture inboard of the backup valve.

b. The torpedo tube muzzle doors identified in item (5) of paragraph 4.5.1.2b shall have emergency remote power closure ability at all depths down to design collapse depth. Closure of the torpedo tube muzzle door against conditions resulting from complete failure of the torpedo tube breech door is not required.

c. Valves and closures identified in item b. of paragraph 4.5.1.2 shall shut as rapidly as possible without damage to the valves and/or their attachments from the effects of rapid closure and in not more than 10 seconds. Flooding control valves shall shut as rapidly as possible without damage to piping and components from the effects of rapid closure.

d. For combination hull and backup valves where the hull valve is a poppet type valve, the hull valve shall shut at least one second before its associated backup valve.

e. The Main Sea Water System hull and backup valves shall open as rapidly as possible without damaging piping and components from the effects of rapid opening and in not more than 10 seconds.

f. Main Sea Water (MSW) hull and backup valves shall be capable of opening against a pressure differential across the valve equal to collapse depth pressure. Poppet type hull valves may have equalization features to meet this characteristic.

g. The Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher muzzle door (or valve) shall be designed to be opened at all depths down to design collapse depth. The TDU muzzle, torpedo tube muzzle, and ejection pump muzzle doors shall be capable of being opened at all depths down to test depth. The Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher muzzle, TDU muzzle, torpedo tube muzzle, and ejection pump muzzle doors shall open only with a differential seawater pressure small enough to ensure against damage caused by inadvertent opening without prior equalization.

h. All valves, other than those described in items f. and g. above, which require emergency remote power operation shall be capable of being opened from their normal control stations at all depths down to test depth against a pressure differential across the valve equal to test depth pressure, except that poppet type hull valves may have equalization features to meet this requirement. These valves shall be designed to open as rapidly as possible, but with no damage to piping and components from the effects of rapid opening.

4.5.1.3.2 QUALIFICATION CHARACTERISTICS.

In addition to the qualification requirements of the applicable specifications, the following performance tests shall be satisfactorily accomplished for prototype valves and closures identified in item b. of paragraph 4.5.1.2:

a. 50 full valve cycles (open-to-shut-to-open) against a differential pressure equal to collapse depth pressure.

b. After accomplishment of item a. above, breakaway torque shall be measured after the valve has been closed for 72 hours against a differential pressure equal to test depth. The hydraulic pressure to operate the valve shall not exceed 75 percent of the nominal operating pressure of the designated hydraulic system.

4.5.1.4 EMERGENCY FLOOD CONTROL HYDRAULIC SYSTEM TEST REQUIREMENTS.

4.5.1.4.1 AT-SEA EMERGENCY FLOOD CONTROL HYDRAULIC SYSTEM TESTS FOLLOWING ORIGINAL INSTALLATION, MAJOR MODIFICATION, OR OVERHAUL/MAJOR DEPOT AVAILABILITY.

During sea trials, the Emergency Flood Control Hydraulic System shall be tested in accordance with NAVSEAINST C9094.2.

4.5.1.4.2 DOCKSIDE EMERGENCY FLOOD CONTROL HYDRAULIC SYSTEM TESTS FOLLOWING ROUTINE MAINTENANCE AND REPAIR WORK.

Where work done on the Emergency Flood Control Hydraulic System consisted of routine repairs, adjustments, and testing such that measured URO/MRC parameters are or may be affected, the Emergency Flood Control Hydraulic System shall be tested to demonstrate proper operation for the potentially affected parameter in accordance with the applicable portion of URO/MRC 025 (Operational Tests of Emergency Flood Control Hydraulic System) and URO/MRC 026 (Tightness Test of Flood Control Accumulators, Air Flasks and Isolation Check Valves). Testing would not be required if a technical evaluation of the work performed determined that URO/MRC measured parameters would not be affected.

4.5.1.5 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Emergency Flood Control Hydraulic System are as specified in Section 4.6.

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4.5.2 SHIP CONTROL.

4.5.2.1 BOUNDARY DEFINITION.

The following elements define the boundary:

a. Stern Plane Linkages:

(1) Stern plane operating linkages and pressure hull penetrators from and including the hydraulic cylinder up to and including the yoke.

NOTE

The stern plane stocks and stern planes are not included in the SUBSAFE boundary.

(2) All stern diving control sticks and their associated linkages up to but not including any hydraulic control valve operated by the control stick and linkage. For clarification, for those submarines utilizing "fly by wire" technology, stern diving control sticks and associated linkages are excluded from the boundary.

(3) Stern plane feedback linkages and all linkages associated with normal, auxiliary, or mechanical indication of stern plane angles, including the linkages associated with the feedback transmitter, follow-up mechanisms, and normal and auxiliary angle transmitters.

b. Hydraulic piping and components, failure of which could affect all modes of operation from the ship control station for stern planes.

NOTE

The hydraulic system header piping and the hydraulic system power plant are not included in the SUBSAFE boundary.

c. Mechanical and hydraulic components up to and including the supply header isolation valves associated with remotely engageable and disengageable stern plane angle limiting devices (when required by design).

4.5.2.2 SUBSAFE DESIGN REQUIREMENTS.

4.5.2.2.1 UNIQUE DESIGN CRITERIA.

The following criteria shall apply:

a. A positive means of shifting from normal to emergency mode not dependent upon electrical power shall be provided at the control station within reach of the operators. For those submarines utilizing “fly by wire” technology, the positive means of shifting is not required to be at the control station or within reach of the operators.

b. The hydraulic power plants and systems supplying power to the stern planes shall be designed to provide reliability such that no single casualty upstream of a power transfer valve shall render all modes of control for any stern plane inoperative.

c. Unmanned valves in the stern diving hydraulic control systems shall be designed to prevent inadvertent operation due to vibration, shock, or accidental bumping by personnel.

d. Linkage mechanisms shall be designed so that bolts used in these systems to connect linkages or to secure vital components shall be installed in a position such that loss of the nut or retaining device shall not permit the bolt to fall out due to gravity forces.

e. Hydraulic and electrical power sources shall be independent such that at least one normal or one emergency mode of control is available in the control room for each stern plane during a casualty to any single power source.

f. Flexible connectors shall not be installed.

4.5.2.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to Ship Control are as specified below and in Section 4.6.

4.5.2.3.1 SUBSAFE SYSTEM TEST REQUIREMENTS.

Ship Control tests shall be performed in accordance with Section 4.6.8. In addition, the following visual and operational tests shall be accomplished.

4.5.2.3.1.1 SHIP CONTROL SYSTEMS VISUAL INSPECTION REQUIREMENTS FOLLOWING ORIGINAL INSTALLATION, MAJOR MODIFICATION, OR OVERHAUL/MAJOR DEPOT AVAILABILITY.

Ship Control Systems shall be inspected to demonstrate conformance with system drawings and applicable specifications. The inspections shall include the following:

a. The activating linkage for hydraulic control valves, feedback transmitters, follow-up mechanisms, and normal and auxiliary angle transmitters shall be inspected to verify the mechanisms and linkages are installed per applicable drawings.

b. For submarines not utilizing "fly by wire" technology, the control sticks and connecting linkages shall be inspected for absence of interferences which would conceivably jam these components. The inspection shall verify the components are installed per applicable drawings.

c. The control surface operating linkages from the hydraulic cylinder up to and including the joint between the yoke and the stock, shall be verified to be installed in accordance with the applicable drawings.

4.5.2.3.1.2 SHIP CONTROL SYSTEMS OPERATIONAL TESTING FOLLOWING ORIGINAL INSTALLATION, MAJOR MODIFICATION, OR OVERHAUL/MAJOR DEPOT AVAILABILITY.

Ship Control operational testing includes elements of Ship Control Systems not in the boundaries defined in section 4.5.2.1. This is necessary to ensure an adequate level of confidence exists in the operation of the Ship Control Systems. Those portions of the systems not within the boundary are not subject to the certification requirements of this manual. Testing shall be in accordance with class and individual ship test forms developed to reflect applicable specification requirements. The tests shall include the following dockside tests:

a. The normal and auxiliary angle indicators for all control surfaces shall be tested to demonstrate required performance.

b. All normal and emergency modes, except automatic control modes, shall be demonstrated for all control surfaces. Testing shall include rate of travel and verification that actual position obtained is within the required degrees of tolerance of the ordered angle.

c. Verify that the position of the control surface at the hardstop positions are within the required limits and that the piston of each control surface cylinder clears the end of the cylinder by the required distance at the hardstop position.

d. Verify that each control surface will shift from Normal to Emergency modes under required conditions within specified times.

e. Verify proper operation of any control surface angle limiting stop.

4.5.2.3.1.3 DOCKSIDE/DRYDOCK STERN DIVING PLANES SYSTEM TESTS FOLLOWING ROUTINE MAINTENANCE AND REPAIR WORK.

Where work done on the Stern Diving Planes System (hydraulic/mechanical system piping, components and operating linkages) consisted of routine repairs, adjustments, and testing such that measured URO/MRC parameters are or may be affected, the Stern Diving Planes System shall be tested to demonstrate proper operation for the affected parameters in accordance with the applicable portions of URO/MRC 016 and/or 019 (Stern Diving Planes System; Dockside Operational Test and Inspection of Internal Control Linkages). Testing would not be required if a technical evaluation of the work performed determined that URO/MRC measured parameters would not be affected.

4.5.2.3.2 OBJECTIVE QUALITY EVIDENCE (OQE).

The requirements of Section 4.6.10 shall apply to all certifiable attributes. In addition, documentation is required for the visual inspections required in section 4.5.2.3.1.1 which verify that the system linkages were either installed or reinstalled in accordance with applicable drawings. This documentation requirement may be satisfied either by a visual inspection report after installation/reinstallation or by a controlled assembly/reassembly record.

4.5.3 MAIN PROPULSION SHAFT.

4.5.3.1 BOUNDARY DEFINITION.

a. The main propulsion shaft penetrating the pressure hull including:

(1) Shaft.

(2) Shaft seal sleeve.

(3) Shaft bore plugs.

(4) Plugs in the shaft bore plugs.

b. The following items are specifically excluded:

(1) Sand and non-metallic coverings.

(2) Shaft couplings including keys, fasteners, and collars.

(3) Sleeves other than shaft seal sleeve.

4.5.3.2 SUBSAFE DESIGN REQUIREMENTS.

4.5.3.2.1 UNIQUE DESIGN CRITERIA.

a. Hollow shafts that penetrate the Pressure Hull Structure shall be capable of withstanding an internal pressure equal to collapse depth pressure.

b. A shaft retaining feature shall be provided to prevent pullout of the shaft through the shaft seals with resultant flooding, in the event of shaft failure inboard of the Shaft Seal System (see paragraph 4.5.4.2.1).

4.5.3.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Main Propulsion Shaft are as specified in Section 4.6.

4.5.3.3.1 TESTS AND INSPECTIONS.

During refurbishment, the main propulsion shaft shall be UT inspected in accordance with the Submarine Maintenance Standard (Technical Repair Standard (TRS) 0203-086-009 or Maintenance and Repair Procedure (MRP) 2430-081-001) or as otherwise approved by NAVSEA.

4.5.4 SHAFT SEAL/SEAL HOUSING.

4.5.4.1 BOUNDARY DEFINITION.

The external portions of the seal which are designed to withstand the differential between sea pressure and internal atmospheric pressure and extend from and include that portion of the seal which interfaces with the pressure hull inboard to and including the stuffing box and gland which retain the flax packing. Included are the internal seal parts which are designed to be or act as a shaft retention device. Fasteners within the boundary are specifically included. For 726 Class submarines, also included are the forward and aft seal housings seal water cooling tubes, and flanges welded to the housing.

NOTE

The hydraulic system which activates the emergency packing compactor is specifically excluded.

4.5.4.2 SUBSAFE DESIGN REQUIREMENTS.

4.5.4.2.1 UNIQUE DESIGN CRITERIA.

A shaft retaining feature shall prevent pullout of the shaft through the shaft seals with resultant flooding, in the event of shaft failure inboard of the Shaft Seal System.

4.5.4.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Shaft Seal/Seal Housing are as specified in Section 4.6.

4.5.5 TRASH DISPOSAL UNIT.

4.5.5.1 BOUNDARY DEFINITION.

The following criteria define the boundary:

a. The Trash Disposal Unit (TDU) muzzle valve shall be considered to act as a hull valve and the next inboard valve or closure as the equivalent of a backup valve.

b. Components of the TDU including such items as the barrel, breech door, hull valve, locking rings, sleeves, stem, and stuffing boxes where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area and greater.

c. Any piping system associated with the TDU shall be defined in accordance with the applicable portion of Section 4.4.

d. Those portions of mechanical, hydraulic, or electrical interlock systems that control the operation of a valve or other device, and prevent inadvertent operation of that valve or device at a time that would permit uncontrolled entry of seawater into the submarine or a system not designed to withstand test depth pressure.

4.5.5.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Trash Disposal Unit are as specified in Section 4.6. The specific Emergency Flood Control Hydraulic System requirements which apply to the Trash Disposal Unit are as specified in Section 4.5.1.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.6 INTERNAL COUNTERMEASURE LAUNCHER/SIGNAL EJECTOR/INTERNAL AUXILIARY LAUNCHER.

4.5.6.1 BOUNDARY DEFINITION.

The following criteria define the boundary:

a. The Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher muzzle valve shall be considered to act as a hull valve and the next inboard valve or closure as the equivalent of a backup valve.

b. Components of the Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher including such items as the barrel, breech door, muzzle valve, locking rings, sleeves, stem, stuffing boxes, impulse or ejection system (including hand ram), where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area and greater.

c. Any piping system associated with the Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher shall be defined in accordance with the applicable portion of Section 4.4.

d. Those portions of mechanical, hydraulic, or electrical interlock systems that control the operation of a valve or other device, and prevent inadvertent operation of that valve or device at a time that would permit uncontrolled entry of seawater into the submarine or a system not designed to withstand collapse depth pressure.

4.5.6.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher are as specified in Section 4.6. The specific Emergency Flood Control Hydraulic System requirements which apply to the Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher are as specified in Section 4.5.1.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.7 TORPEDO TUBES AND EJECTION PUMP.

4.5.7.1 BOUNDARY DEFINITION.

The following criteria define the boundary:

a. For the Torpedo Tubes and Ejection Pump, the muzzle door, sea valve door, or slide valve (if applicable) shall be considered to act as a hull valve, and the next inboard valve or closure as the equivalent of a backup valve.

b. Components of the Torpedo Tubes and Ejection Pump, including such items as the torpedo tube barrels, breech and muzzle doors, locking rings, sleeves, shafts, stuffing boxes, ejection pump water cylinder and sea valve door, where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area and greater.

c. Any piping system associated with the Torpedo Tubes or Ejection Pump shall be defined in accordance with the applicable portion of Section 4.4.

d. Those portions of mechanical, hydraulic, or electrical interlock systems that control the operation of a valve or other device (e.g., muzzle and sea valve doors), and prevent inadvertent operation of that valve or device at a time that would permit uncontrolled entry of seawater into the submarine or a system not designed to withstand test depth pressure.

4.5.7.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Torpedo Tubes and Ejection Pump are as specified in Section 4.6. The specific Emergency Flood Control Hydraulic System requirements which apply to the Torpedo Tubes and Ejection Pump are as specified in Section 4.5.1.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.8 OUTBOARD GREASE SYSTEM.

4.5.8.1 BOUNDARY DEFINITION.

a. The Outboard Grease System penetrating the pressure hull where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area and greater including:

(1) Valve body.

(2) Valve retainer.

(3) Valve cap and associated fasteners.

(4) Rotor.

(5) Needle valve.

b. The following items are specifically excluded:

(1) Grease fitting.

(2) Handle.

(3) Handle fastener.

(4) Outboard piping including the connection to the valve body.

4.5.8.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Outboard Grease System are as specified in Section 4.6.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.9 ELECTRICAL HULL FITTINGS (EHFs).

4.5.9.1 BOUNDARY DEFINITION.

a. The electrical hull fittings penetrating the pressure hull, where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area or greater including:

(1) Connector body, including associated welded or mechanical joints.

(2) Outboard cover when installed.

(3) Body nut.

(4) Gland nut.

b. The following items are specifically excluded:

(1) Cable.

(2) Retainer plates.

(3) Washers.

(4) Dowel pins.

(5) Molded insert assemblies.

4.5.9.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to Electrical Hull Fittings are as specified in Section 4.6.

NOTES

1. The weld at the hull fitting interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.10 PERISCOPES AND ANTENNAS.

4.5.10.1 BOUNDARY DEFINITION.

a. Periscopes, antennas, and associated hydraulic cylinders that penetrate the pressure hull where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area and greater, including:

(1) Periscope and antenna pressure retaining envelopes both inside and outside the hull.

(2) Hull fittings.

(3) Packing glands and associated fasteners.

(4) Hydraulic cylinder assemblies including:

(a) Hydraulic cylinder.

(b) Outboard retainer nut.

(5) Head window assembly and eyepiece box assembly with associated fasteners.

(6) Staunching plate on Type 18 periscope only.

b. The following items are specifically excluded:

(1) Inboard and outboard hydraulic piping.

(2) Wiper and retaining ring.

(3) Outboard hydraulic cylinder head.

(4) Outboard bearing sleeves.

(5) Inboard retainer nut.

(6) Cylinder bottom.

(7) Piston.

(8) Piston rod.

(9) Eyepiece box on Type 18 periscope only.

4.5.10.2 SUBSAFE DESIGN REQUIREMENTS.

4.5.10.2.1 UNIQUE DESIGN CRITERIA.

All hollow shafts or masts shall be capable of withstanding an internal pressure equal to collapse depth pressure.

4.5.10.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to Periscopes and Antennas are as specified in Section 4.6.

4.5.11 TOWED SONAR ARRAY/FLOATING WIRE ANTENNA VALVE STACKS.

4.5.11.1 BOUNDARY DEFINITION.

a. The towed sonar array valve stack, from and including the seal housing and associated fasteners outboard to the hull.

b. For SSN 688 Class and later, the floating wire antenna valve stack, from and including the inboard joint of the backup valve outboard to the hull. For Pre-SSN 688 Class, the floating wire antenna valve stack, from and including the upper ball check valve and associated fasteners outboard to the hull.

c. Floating wire antenna conduit from the hull to and including the penetration in the bridge access trunk where applicable.

4.5.11.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the Towed Sonar Array/Floating Wire Antenna Valve Stacks are as specified in Section 4.6.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.12 SOLID SHAFTS THAT PENETRATE THE PRESSURE HULL.

4.5.12.1 BOUNDARY DEFINITION.

a. Solid shafts penetrating the pressure hull from the inboard coupling to the outboard coupling. Where the coupling is used as the shaft retention feature the coupling shall be included in the boundary.

b. Packing gland, associated fasteners, and packing, excluding outboard spacers and outboard bearing sleeves.

c. Shaft retention feature.

4.5.12.2 SUBSAFE DESIGN REQUIREMENTS.

4.5.12.2.1 UNIQUE DESIGN CRITERIA.

A shaft retaining feature shall be provided to prevent pullout of the shaft through the hull penetration both inboard and outboard of the hull in the event of shaft failure anywhere along its length.

4.5.12.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to solid shafts that penetrate the pressure hull are as specified in Section 4.6.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.13 SECONDARY PROPULSION MOTOR (SPM) COLUMN.

4.5.13.1 BOUNDARY DEFINITION.

For those ships whose SPM column penetrates the pressure hull, the boundary shall consist of:

a. Column.

b. Upper column sealing plate and associated fasteners.

c. SPM flange to column and associated fasteners.

d. Column retention feature.

e. Electrical penetrators.

4.5.13.2 SUBSAFE DESIGN REQUIREMENTS.

4.5.13.2.1 UNIQUE DESIGN CRITERIA.

All hollow shafts shall be capable of withstanding an internal pressure equal to collapse depth pressure.

4.5.13.3 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to the SPM Column are as specified in Section 4.6.

4.5.14 NON-SEA-CONNECTED PIPING SYSTEMS WHICH PENETRATE THE PRESSURE HULL.

4.5.14.1 BOUNDARY DEFINITION.

a. Piping systems and components, NPS 1/2 or larger, which operate at pressures less than collapse depth pressure, from and including the inboard connection of the first isolation valve inboard of the hull out to and including the outboard connection to the hull. Where the piping system is terminated by a hull blanking plug, the boundary includes the external blanking plug inboard to and including the inboard joint or flange of the backup valve.

b. For piping systems and components, NPS 1/2 or larger, which are designed and tested to operate at pressures greater than collapse depth pressure, the pressure hull non-compensating pipe sleeve and associated welds constitute the boundary.

4.5.14.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to non-sea-connected piping systems which penetrate the pressure hull are as specified in Section 4.6.

NOTES

1. The weld at the hull valve interface with the pressure hull insert/pressure hull is included in the Pressure Hull Structure Boundary and shall be controlled by Section 4.6.3.

2. The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.5.15 OTHER PRESSURE HULL PENETRATORS/FITTINGS.

NOTE

This section applies to pressure hull penetrators/fittings not covered elsewhere in Section 4.5.

4.5.15.1 BOUNDARY DEFINITION.

The following criteria define the boundary:

a. For devices which penetrate the pressure hull boundaries established in Sections 4.3.1 and 4.3.2, the boundary is from and includes the first inboard retaining device and its associated penetrator and/or connector body outboard through and including portions of the penetrator and/or connector body and gland nuts for stuffing tubes.

b. For system components or assemblies which penetrate the boundaries established in Sections 4.3.1 and 4.3.2, the boundary shall include portions of pressure hull non-compensating sleeves, bushings, bearings, mechanical seals valve stem retainers or other items where single failure would result in flooding into the ship through a hole 0.6 inch diameter or equivalent area and greater. Holding devices which are designed to constrain the movement of these devices are also included.

4.5.15.2 SUBSAFE REQUIREMENTS.

The specific SUBSAFE technical requirements which apply to pressure hull penetrators/fittings are as specified in Section 4.6.

NOTE

The sleeve and the connecting weld(s) between the sleeve and the pressure hull included in the Pressure Hull Structure Boundary shall be controlled by Section 4.6.3. That which passes through the sleeve and any associated stuffing boxes, connector welds, etc., shall be controlled by the remainder of Section 4.6.

4.6 SUBSAFE REQUIREMENTS.

Requirements listed in the following sections are statements that apply to the items of structure, equipment/system, and components within the SUBSAFE Certification boundaries discussed in Sections 4.3, 4.4, and 4.5.

a. Design Review (4.6.1).

b. Departures from Specifications within the SUBSAFE Boundary (4.6.2).

c. Pressure Hull (4.6.3).

d. Piping Systems and Machinery Material, Fabrication, and NDT (4.6.4).

e. Hull Integrity Fasteners (4.6.5).

f. Material Identification and Control Requirements (4.6.6).

g. Flexible Connectors (4.6.7).

h. Testing (4.6.8).

i. Selected Record Drawings/Data (SRD/D) (4.6.9).

j. Documentation Required for Certification (4.6.10).

k. Design Yard and Shipbuilder Ship's Equipment Drawings and Other Required SUBSAFE Certification Data Requirements (4.6.11).

l. Government Furnished Equipment (GFE)/Government Furnished Material (GFM) Certification Requirements (4.6.12).

4.6.1 DESIGN REVIEW.

A design review shall be conducted in accordance with the procedures specified in the Submarine Material Certification Design Review Procedures Manual, NAVSEA 0941-LP-041-3010.

4.6.2 DEPARTURES FROM SPECIFICATIONS WITHIN THE SUBSAFE BOUNDARY.

Departures from specifications within the SUBSAFE Boundary shall be administered in accordance with the procedures specified in Section 3.4.

4.6.3 PRESSURE HULL.

Material, fabrication, and NDT of HY-130, HY-80/100, and HSS shall be in accordance with the requirements of NAVSEA T9074-AD-GIB-010/1688:

a. All materials used in the Hull Structure during fabrication or repair, including weld filler materials, shall be controlled/certified in accordance with NAVSEA T9074-AD-GIB-010/1688 the applicable material specification. Documented approval by COMNAVSEA shall exist for first time use of a hull material system (material, joining techniques, product forms).

b. All pressure hull material shall be traceable in accordance with NAVSEA T9074-AD-GIB-010/1688.

4.6.3.1 OBJECTIVE QUALITY EVIDENCE (OQE).

Objective Quality Evidence (OQE) shall be as specified in the applicable fabrication document, specification, standard, and/or drawing.

4.6.4 PIPING SYSTEMS AND MACHINERY MATERIAL, FABRICATION, AND NDT.

Materials for machinery, equipment, piping, joints, and castings shall be selected, manufactured, fabricated, and inspected in accordance with the approved system diagram, applicable specifications, and the following requirements.

4.6.4.1 WELDED JOINTS.

Piping and machinery welded joints within the boundaries of sections 4.3, 4.4, and 4.5 shall be welded in accordance with NAVSEA S9074-AR-GIB-010/278.

4.6.4.1.1 WELDED JOINT OQE.

Weld joint records shall be provided to document that processes, materials and procedures, joint fit-up, joint preparation, and NDT, including visuals, are in accordance with NAVSEA S9074-AR-GIB-010/278.

4.6.4.2 MECHANICAL JOINTS.

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Mechanical joints may be installed in piping systems and machinery components within the boundaries of sections 4.3, 4.4, and 4.5, and shall comply with the following:

4.6.4.2.1 BOLTED PRESSURE BOUNDARY JOINTS.

a. Bolted pressure boundary joints are defined as joints which utilize bolts, nuts, studs, stud-bolts, or screws to join two pressure boundary parts. Specifically included are joints meeting the above description located in piping runs, valves, piping system components, hull fittings, and machinery. Specifically excluded are joints, failure of which will not permit escape or intrusion of the controlled fluid.

b. Material shall be in accordance with the applicable drawing or MIL-STD-438 except hull integrity fasteners shall be in accordance with Section 4.6.5. Valve and component fasteners shall be in accordance with applicable component/equipment specifications, except the requirements of MIL-STD-438 shall apply if the component/equipment specifications are silent.

c. Procedures for fastener tightening, including torque values where applicable, flange alignment, flange joint acceptance, reuse of fasteners and visual inspections, shall be in accordance with NAVSEA S9505-AM-GYD-010 or NAVSEA approved bolting procedures.

4.6.4.2.1.1 BOLTED PRESSURE BOUNDARY JOINT OQE.

a. A mechanical joint assembly procedure in compliance with NAVSEA S9505-AM-GYD-010, or NAVSEA approved bolting procedures, shall be provided.

b. An individual mechanical joint record is required for each shipbuilder/maintenance activity assembled bolted pressure boundary joint (including piping joints, components, fittings, plugs and machinery joints) where failure of the joint would result in flooding into or out of the system: through a hole 0.28 square inches (0.6 inch diameter) or equivalent area and greater within seawater or sea-connected piping systems NPS 1/2 and larger from the inboard joint of the backup valve (or equivalent) outboard; and, through a hole 4 inches or equivalent diameter, or of equivalent area, or greater for seawater or sea-connected piping systems NPS 4 and larger inboard of the backup valve. The mechanical joint record shall identify, as a minimum, the following:

(1) Ship (component serial number for vendor assembled joints).

(2) System or component.

(3) Joint number.

(4) Size and type of fastener.

(5) Joint material (e.g., flange, component, etc.) markings and fastener markings per NAVSEA 0948-LP-045-7010, where applicable. Reused hull integrity fasteners shall have objective quality evidence in accordance with paragraph 4.6.5.3.

(6) Torque required and torque applied.

(7) Lubricant used.

(8) Torque wrench/tightening device serial number and calibration date.

(9) Signature and badge number of certifier and date.

c. For other shipbuilder/maintenance activity assembled bolted pressure boundary joints in either: 1) SUBSAFE sea-connected/seawater piping less than NPS 4 inboard from the inboard joint of the backup valve (or equivalent) for pre-SSN 688 Class, or 2) non-sea-connected/seawater SUBSAFE piping for all classes (e.g., EMBT Blow, Emergency Flood Control, and Stern Diving Systems), an individual joint record is not required. However, the following shall be identified as a minimum:

(1) Ship.

(2) System or component.

(3) Traceability to joint.

(4) Joint type.

(5) Signature and badge number of certifier and date, documenting compliance with all drawings and specified requirements.

d. For vendor assembled bolted pressure boundary joints as described in paragraphs b. and c. above the following OQE is required:

(1) A torque record reflecting actual torque applied and lubricant used where Design Yard developed ordering data (e.g., drawings, coded notes, etc.) or the shipbuilder specify such records.

(2) For all other instances, a certificate of compliance attesting to conformance with all drawing and specified requirements will be provided to the shipbuilder by the vendor.

(3) For material supplied by the Level I/SS stock program, a Certificate of Compliance is not required.

4.6.4.2.2 UNION JOINTS.

Material of union components shall be in accordance with the applicable drawing or MIL-STD-438.

4.6.4.2.2.1 UNION JOINT OQE.

a. For shipbuilder/maintenance activity assembled union joints, an assembly procedure in accordance with NAVSEA S9505-AM-GYD-010, or NAVSEA approved procedures, shall be provided. However, the following shall be identified as a minimum:

(1) Ship.

(2) System or component.

(3) Traceability to joint.

(4) Joint type.

(5) Signature and badge number of certifier and date, documenting compliance with all drawings and specified requirements.

b. For vendor assembled union joints, a certificate of compliance is required attesting to conformance with all drawing and specified requirements. For material supplied by the Level I/SS stock program, a Certificate of Compliance is not required.

4.6.4.2.3 OTHER SUBSAFE MECHANICAL JOINTS.

The requirements herein apply to all other mechanical joints within the SUBSAFE boundary not defined in sections 4.6.4.2.1 and 4.6.4.2.2. Examples include linkages, electrical hull fittings, threaded valve bonnets, and interlocks.

4.6.4.2.3.1 OTHER SUBSAFE MECHANICAL JOINT OQE.

a. For other shipbuilder/maintenance activity assembled mechanical joints within the SUBSAFE boundary, an individual joint record is not required. However, the following shall be identified as a minimum:

(1) Ship.

(2) System or component.

(3) Traceability to joint.

(4) Joint type.

(5) Signature and badge number of certifier and date, documenting compliance with all drawings and specified requirements.

b. For other vendor assembled mechanical joints within the SUBSAFE boundary the following OQE is required:

(1) A torque record reflecting actual torque applied and lubricant used where Design Yard/Planning Yard developed ordering data (e.g., drawings, coded notes, etc.) or the shipbuilder specify such records.

(2) For all other instances, a certificate of compliance attesting to conformance with all drawing and specified requirements will be provided to the shipbuilder by the vendor. For material supplied by the Level I/SS stock program a Certificate of Compliance is not required.

4.6.4.3 BRAZED JOINTS.

For pre-SSN 688 Class submarines, when permitted by previous system design, joints within the boundaries of Sections 4.4 and 4.5 shall be brazed in accordance with NAVSEA 0900-LP-001-7000. Brazed joints shall not be installed in the boundaries of Sections 4.4 and 4.5 for SSN 688 Class and later classes of submarines.

4.6.4.3.1 BRAZED JOINT OQE.

Brazed joint records shall be provided to document that processes, materials, and procedures, joint fit-up, joint preparation, and NDT, including visuals, are in accordance with NAVSEA 0900-LP-001-7000.

4.6.4.4 CASTINGS.

Castings shall have NDT in accordance with NAVSEA S9074-AR-GIB-010/278 and NAVSEA T9074-AS-GIB-010/271.

4.6.4.5 FORGINGS/WROUGHT MATERIAL.

To ensure SUBSAFE system integrity, there shall be auditable material control and inspection records as required by NAVSEA S9074-AR-GIB-010/278 and other applicable drawing or specification requirements.

4.6.5 HULL INTEGRITY FASTENERS.

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4.6.5.1 DEFINITION.

Hull integrity fasteners are defined as male threaded items such as bolts, socket head cap screws, studs, and bolt studs which are loaded by the differential between sea pressure and internal atmospheric pressure, and which are a part of pressure hull integrity components or of systems penetrating the Pressure Hull Structure, from the pressure hull to and including the inboard joint of the backup valve or its equivalent. Nuts and lockwashers are specifically excluded.

4.6.5.2 REQUIREMENTS.

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a. Hull integrity fasteners shall be manufactured from nickel-copper-aluminum alloy (K-Monel), in accordance with MIL-S-1222, or as specified by NAVSEA, certified, and marked in accordance with NAVSEA 0948-LP-045-7010.

b. Studs and bolt studs shall be a constant strength design in accordance with MIL-S-1222.

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c. Reused hull integrity fasteners must be marked legibly with symbols of recognizable significance (e.g., ·K·). Unmarked or illegibly marked hull integrity fasteners shall be replaced with one exception: studs in hull liners or component bodies not removed may remain if demonstrated by generic material identification test to be the proper generic material per drawing. To preclude future reinspections, once verified to be generic K-Monel, these studs may be marked with the letters KM and the testing activity's assigned Level I CAD. This marking is acceptable proof of proper generic material. Any studs in hull liners or component bodies fully removed must exhibit proper marking in accordance with NAVSEA 0948-LP-045-7010 or be replaced.

d. Fasteners of different materials in a bolt circle are not permitted and must be made uniform per drawing.

4.6.5.3 OBJECTIVE QUALITY EVIDENCE (OQE).

Hull integrity fasteners shall be verifiable by OQE as required by NAVSEA 0948-LP-045-7010. Reused hull integrity fasteners shall have OQE of meeting the requirements in paragraph 4.6.5.2c.

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4.6.6 MATERIAL IDENTIFICATION AND CONTROL REQUIREMENTS.

This section defines the requirements to be met to maintain adequate identification of the controlled material to be used within the SUBSAFE Certification Boundary. OQE for the material control requirements of this section shall be traceable from the installing activity's documentation records and/or re-entry control system.

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a. Categories for material identification and control requirements:

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(1) Level I material is defined by and shall be controlled in accordance with NAVSEA 0948-LP-045-7010, Material Control Standard (Non-Nuclear).

(2) Hull Structural Material (HY-130, HY-80/100, and HSS) is defined by and shall be controlled in accordance with NAVSEA T9074-AD-GIB-010/1688.

(3) Controlled Industrial Material (CIM), where specified, shall be controlled in accordance with NAVSEAINST 4855.30, Control of Non-level Material, or as invoked by applicable specifications.

(4) Metallic material not covered by items a.(1), a.(2), and a.(3) above shall be in accordance with the applicable specifications and drawings. The installing activity shall provide assurance that the material is the correct generic material type in accordance with the applicable specifications and drawings. Disassembly of components is not required for material verification.

(a) Material received from the National Stock System is acceptable without generic testing if it is properly identified by stock number and/or item description, unless it is obviously incorrect based on marking, packaging, color, etc.

(b) Items manufactured from material per Military/Federal/ Commercial Specification shall be marked or packaged identifying the applicable specification, and is acceptable without generic testing provided the items are properly identified.

(c) Material received directly from a vendor is acceptable without generic testing if it is marked/packaged with symbols indicating material type or providing product identification (e.g., part no., drawing/item no.).

(d) When material in item a.(4)(a), a.(4)(b), or a.(4)(c) above requires generic testing for acceptance, the cognizant technical authority shall specify the generic material testing to be utilized.

(5) Existing material is acceptable for reuse in the same ship and location (e.g., joint) without further test(s) unless it is obviously incorrect based on marking, color, corrosion, etc. Documentation records shall identify this as existing material.

(6) Non-metallic material shall be controlled in accordance with the applicable specifications and drawings and shall be marked or identified with product description, National Stock Number, or specification, as appropriate. Generic testing is not required.

b. Objective Quality Evidence (OQE) required for newly installed materials covered by this section shall be in accordance with the following:

(1) Level I Material - NAVSEA 0948-LP-045-7010.

(2) Hull Structural Material - NAVSEA T9074-AD-GIB-010/1688. Structural non-metallics which are designed to withstand the differential between internal atmospheric pressure and the collapse depth pressure of the submarine shall be certified to requirements approved by NAVSEA for each material and application.

(3) CIM Material - NAVSEAINST 4855.30 or as invoked by applicable specifications.

(4) Metallic and non-metallic materials not covered by items b.(1), b.(2), and b.(3) above shall include identification of at least one of the following:

(a) Stock Number (from package/container/tag).

(b) Part Number (from package/piece).

(c) Local Traceability Number (from piece/tag).

(d) Drawing and Piece Number (from piece/tag).

(e) Generic or Material Specification Marking (from piece).

(f) Results of Generic Testing.

For reuse of existing material, documentation records shall identify this material as existing. Reuse of hull integrity fasteners shall be documented in accordance with paragraph 4.6.5.3.

4.6.7 FLEXIBLE CONNECTORS.

Flexible connectors shall not be installed between the inboard flange or joint of the backup valve outboard to the hull. Flexible connectors installed from the inboard flange and joint of the backup valve inboard for any sea-connected system open to sea below 200 feet in any non-casualty mode of operation shall either be RISIC type in accordance with NAVSEA S6430-AE-TED-020, Volume 2, or other connector approved by NAVSEA.

4.6.7.1 RECORDS.

Documentation of tests and inspections required by NAVSEA S6430-AE-TED-020 shall be developed and maintained by the installing activity.

4.6.8 TESTING.

To ensure that work was satisfactorily accomplished and installation was performed to provide system integrity, all work within the SUBSAFE Certification Boundary shall be tested and have documented data to meet the following requirements. Control of testing and ship conditions shall be in accordance with NAVSEA 0905-LP-485-6010. The shipyard shall prepare an integrated test plan. The plan shall include, on a time base if feasible, all tests which must be accomplished leading up to dock trials, fast cruise, sea trials, and completion. All SUBSAFE tests or portions of tests shall be annotated by SUBSAFE near the title block. Test form indices shall identify those tests that are SUBSAFE. SUBSAFE Test documents shall indicate satisfactory completion of the following:

a. System or component hydrostatic testing.

b. System or component tightness testing.

c. System or component testing demonstrating operation for hull integrity or ship recovery.

d. Hull and backup valve seat tightness testing.

e. Tank strength and completion tests.

f. Compartment completion tests.

4.6.8.1 PIPING SYSTEMS TESTING.

All piping systems strength and tightness tests shall be conducted and documented in accordance with the applicable acquisition, overhaul, or repair specifications. Completed tests shall be reviewed and approved by the cognizant technical authority.

4.6.8.2 TANK AND COMPARTMENT TESTING.

Tank strength and compartment tightness and completion tests shall be conducted and documented in accordance with the applicable acquisition, overhaul, or repair specifications. Completed tests shall be reviewed and approved by the cognizant technical authority.

4.6.8.3 TESTING FOLLOWING MAINTENANCE ACTIONS.

Final testing to support SUBSAFE Certification of authorized work within the boundaries of Sections 4.3, 4.4, and 4.5 shall be done in accordance with the Standard HM&E Test Program and instructions as outlined below.

a. NAVSEA T9SSN-W4-GYD-010 SSN 688 Class Standard Hull, Mechanical, and Electrical Test Program, for SSN 637 and SSN 688 Class.

b. NAVSEA TL710-AD-MAN-010/SSBN 726 CL (TRIDENT Test Program Manual), for SSBN 726 Class.

c. RESERVED FOR FUTURE USE, FOR SSN 21 CLASS.

d. Operational URO/MRCs as defined in section 6.4.2.d.

e. CINCLANTFLT/CINCPACFLTINST 4790.3, Joint Fleet Maintenance Manual (JFMM).

4.6.8.4 ACCESS TO AND OPERATION OF VITAL EQUIPMENT.

The Design Yard shall develop a class test procedure which lists the ship's components which are vital to emergency recovery of the submarine and to maintain way, and the maximum time for access (access criterion). Table 4-1 is included to provide guidance during development of the list. The list shall include all normal and emergency components requiring immediate and follow-up operation to effect emergency recovery of the submarine and to maintain way.

4.6.8.4.1 ACCESSIBILITY REQUIREMENTS.

The following criteria are established:

a. Shipbuilders and overhaul/repair activities shall ensure that installation, alteration or modification of piping, equipment, lockers, deck-mounted storage, or any other item is controlled in accordance with Section 3.4 and does not affect or restrict the operation of or impede access to vital equipment.

b. Ensure that the component can be reached and operation begun within the time limits established in Table 4-1 by the watchstander who would normally operate the component and from that location (as specified in the test form) where the watchstander might normally be expected to be stationed. If no test form exists, a class test form shall be developed.

c. Ensure that the component to be operated is not enclosed or its operation encumbered by any piping, cabling or other structural interferences. Adequate grabs and ladders shall be provided, as required, to assist access during steep angles.

d. The access to vital equipment test shall be conducted no earlier than 30 days prior to Fast Cruise.

4.6.8.4.2 ACCESSIBILITY CONDITIONS.

The following criteria are established:

a. The component can be reached for operation in an emergency within the time limits established in Table 4-1 by the watchstander who would normally operate the component and from that location where he might normally be expected to be stationed.

b. The time interval from start to finish is expressed as TR (Time Required).

TIME REQUIRED (TR)	INTERPRETATION
0 Sec.	Constant manipulation access.
1 Sec.	Constantly-manned panel, control board, or actuator access.
2 Sec.	Manifold, panel, or actuator access in immediate vicinity of watch station.
10 Sec.	Exposed actuator access on same level in compartment as watch station.
15 Sec., 25 Sec., 2 Min., etc.	As required.

4.6.8.5 OBJECTIVE QUALITY EVIDENCE (OQE).

Documentation shall consist of an index of test forms properly annotated for SUBSAFE tests and the completed SUBSAFE Test Forms.

4.6.8.6 SALVAGE INSPECTION.

The Official Salvage Inspection shall be conducted by the TYCOM and all deficiencies resolved prior to Fast Cruise.

TABLE 4-1.
ACCESS TIME LIMITATION - GENERALIZED GROUPS OF VITAL SHIP EQUIPMENT

VITAL SHIP EQUIPMENT GROUP	ACCESS TIME LIMITATION (SECONDS)
1. Steering:	
a. Normal Steering Helm.	0 (monitor)
b. Associated Normal Steering Station Operating Components.	2 Sec.
c. Emergency Mode Steering Station Controls and Mode Transfer Controls. (Not applicable to NSSN Class due to fly-by-wire controlled system)	1 Sec.
2. Diving:	
a. Normal Diving Station.	0 (monitor)
b. Associated Normal Diving Station Operating Components.	2 Sec.
c. Emergency Mode Diving Station Controls and Mode Transfer Controls. (Not applicable to NSSN Class due to fly-by-wire controlled system)	1 Sec.
3. Propulsion (Main Plant & SSTG):	
a. Electric Plant Control Panel.	1 Sec.
b. Steam Plant Control Panel.	1 Sec.
c. Local Turbine Throttles.	15 Sec.
d. Main Steam Root Valve Control.	2 Sec.
e. Shaft Clutch Controls.	10 Sec.
4. Main Ballast Tanks and Variable Ballast Tanks:	
a. Ballast Control Panel/MBT Blow & Vent Manifolds.	1 Sec.
b. Emergency MBT Blow & Vent Manifolds.	2 Sec.
c. Emergency MBT Blow Valve Local Manual Operators.	10 Sec.
d. Safety and Negative Tank HP Blow Actuating Valves.	2 Sec.
e. MBT Vent Group Actuating Valves.	2 Sec.
f. MBT Vent Group Overrides.	10 Sec. (5 Sec. for pre-688)

TABLE 4-1.
ACCESS TIME LIMITATION - GENERALIZED GROUPS OF VITAL SHIP EQUIPMENT

VITAL SHIP EQUIPMENT GROUP	ACCESS TIME LIMITATION (SECONDS)
4. (Cont'd)	
g. Safety and Negative Vent Controls.	2 Sec.
5. Operators for Hull, Backup, and Flood Control Valves which are mandatory for Immediate and follow-up action to effect emergency recovery and maintain way:	
a. Emergency Closure Flooding Control Stations, including Torpedo Tube and Trash Disposal Units when manned.	2 Sec.
b. Sea-connected System NPS 1 and larger.	10 Sec.
c. Trash Disposal Unit Flood and Drain Valves, when manned.	2 Sec.
6. Torpedo Tube, Missile Tube, Signal Ejector, TDU Muzzle Doors, when manned:	
a. Torpedo Tube Muzzle Door Closure Normal Control Valve.	1 Sec.
b. Signal Ejector Muzzle Door Normal Control Valve.	2 Sec.
c. Trash Disposal Unit Normal Hydraulic Control Valve.	2 Sec.
d. Torpedo Tube Ejection Pump Doors Normal Control Valve Closure.	1 Sec.
e. Missile Tube Door Normal Control Valve.	2 Sec.
7. Communications:	
Communications Systems and Alarms vital to control ship recovery actions.	2 Sec. to nearest system or alarm in any given compartment. (5 Sec. for pre-688)
8. Compartment Isolation:	
a. Valves, NPS 1 and larger, required to maintain bulkhead integrity (except Bulkhead Ventilation Valves).	25 Sec.

TABLE 4-1.
ACCESS TIME LIMITATION - GENERALIZED GROUPS OF VITAL SHIP EQUIPMENT

VITAL SHIP EQUIPMENT GROUP	ACCESS TIME LIMITATION (SECONDS)
8. (Cont'd)	
b. Bulkhead Ventilation Valves.	
(1) Manned compartment.	10 Sec.
(2) Compartment with only roving watch.	25 Sec.
c. Hydraulic Return Isolation Valve.	25 Sec.
9. Compartment Pressurization:	
Valves required to effect compartment pressurization.	25 Sec.

4.6.9 SELECTED RECORD DRAWINGS/DATA (SRD/D).

This section provides the requirements for the documentation needed to support the initial SUBSAFE certification and provide the information required to maintain that certification. Class Baseline Selected Record Drawings (SRD) shall be developed by the Design Yard, and identified and marked "Selected Record Drawing" and "SUBSAFE" adjacent to the title block. The shipbuilder shall perform ship check verification and shall update these baseline SRD to reflect the as-built conditions for each hull. A preliminary copy of the updated SRD shall be provided to the ship prior to Fast Cruise.

4.6.9.1 SUBMARINE SAFETY CERTIFICATION BOUNDARY (SSCB) BOOK.

An SSCB Book shall be developed and maintained. Plates depicting boundary changes shall be submitted to NAVSEA for approval. The SSCB Book shall outline in diagrammatic form the SUBSAFE certification boundaries in Sections 4.3, 4.4, and 4.5. An SSCB Book shall be prepared by the shipbuilder for each new construction submarine.

a. For operational ships, any noted deficiency or discrepancy of the SSCB Book shall be identified to the Design Yard/Planning Yard for immediate correction with a copy to NAVSEA 92Q.

b. Each individual ship book shall be submitted to NAVSEA for review, approval, and assignment of a NAVSEA number prior to printing and distribution of the final issue.

4.6.9.1.1 DESCRIPTION OF THE SUBMARINE SAFETY CERTIFICATION BOUNDARY BOOK.

The SSCB Book shall outline in red and in diagrammatic form the SUBSAFE certifica-tion boundaries established in Sections 4.3, 4.4, and 4.5.

4.6.9.1.2 PREPARATION OF SUBMARINE SAFETY CERTIFICATION BOUNDARY (SSCB) BOOK.

The SSCB Book shall contain the following:

a. Appropriate plates for those areas within the SUBSAFE Certification Boundary including but not limited to those systems described in Sections 4.3, 4.4, and 4.5.

b. An outline plate showing the overall SUBSAFE Certification Boundary.

c. Separate drawings identifying penetrations in the pressure hull watertight boundary.

d. An Introductory Section which describes how the book is to be used. The above SSCB Book plates shall be formatted as follows:

(1) Piping systems shall be in diagrammatic form.

(2) Each individual plate shall include local identification of the hull penetration to the hole number on the appropriate Hull Penetration Plate.

(3) Piping boundary plates shall contain reference to applicable arrangement drawings, system diagrams, or applicable SUBSAFE Mapping Drawings.

4.6.9.1.3 UPDATING OF SSCB BOOK.

a. The shipbuilder shall perform ship check verification to assure SSCB Book accuracy. A preliminary copy of the SSCB Book reflecting the as-built condition shall be provided to the ship prior to Fast Cruise.

b. Any maintenance activity accomplishing modifications within the SUBSAFE boundary which require changes to the SSCB Book shall annotate the SSCB Book and submit the changes to NAVSEA, or its designated activity, for review, approval, and distribution. Responsibilities associated with the SSCB
Book are contained in the appropriate NAVSEA Fleet Modernization Program Management and Operations Manual.

c. Any noted deficiency in the SSCB Book shall be identified to NAVSEA, or its designated activity, for resolution.

4.6.9.2 SUBSAFE CERTIFICATION AUDIT PLAN (SSCAP).

The Design Yard shall develop a class SSCAP, which identifies the SUBSAFE Certification requirements, and forward this plan to NAVSEA for review and approval using Appendix C as a baseline. The SSCAP shall contain the Objective Quality Evidence requirements reflected in the referenced specifications, standards, manuals, and sections within this chapter. The Design Yard shall develop the SSCAP sufficiently early in the class design in order to support the development of population lists to support the audit. The SSCAP shall identify those specific areas to be audited, a description of the requirements including the applicable specification, standard, manual, or SUBSAFE Manual section, and the invoking specification contract section. The class SSCAP will be submitted to NAVSEA for approval. Upon NAVSEA approval, the Design Yard shall forward the class SSCAP to the shipbuilder. See Section 5.5 SSCAP requirements for maintenance availabilities.

4.6.9.3 SHIP'S DRAWING INDEX/SUBSAFE DRAWINGS.

a. The construction activity shall develop and the Planning Yard shall maintain a Ship's Drawing Index (SDI) which identifies the actual drawing revision to which the ship is overhauled/constructed, the supplemental documents which impact the as-built condition (e.g., Engineering Notices, Liaison Action Requests, Design Notices, etc.), and the supporting authorization for those documents. This data shall be controlled and maintained by a system suitable for audit.

b. Drawings that contain SUBSAFE components shall be identified as SUBSAFE to facilitate retrieval from the SDI as necessary.

c. SUBSAFE drawings shall be marked SUBSAFE near the title block.

4.6.9.4 SUBSAFE MAPPING DRAWINGS.

SUBSAFE Mapping Drawings (SSMDs) are designated as Selected Record Drawings (SRDs). Baseline SSMDs shall be prepared for each system (normally one drawing for each system) or major component (e.g., Torpedo Tubes, Trash Disposal Unit, Periscopes, Navigation Radar Mast, Buoyant Cable Antennas, Floating Wire Antennas, Reelable Towed Array, Shaft Seal) contained in the applicable SSCB Book developed by the Design Yard for each class of submarine. SSMDs shall identify, at the component level, all SUBSAFE pressure boundary joints and equipment, including castings requiring RT, hull integrity fasteners, piping, fittings, etc. This includes identification of appropriate structural penetrations, tanks, etc., shown in the SSCB Book for the

applicable system or major component. The shipbuilder shall update these baseline SSMDs to reflect as-built configurations within the SUBSAFE boundary.

4.6.9.4.1 REQUIREMENTS FOR SUBSAFE MAPPING DRAWINGS (SSMDS).

a. DESCRIPTION - SSMDs depict the SUBSAFE certification boundary for individual systems or major components and consist of a title block, standardized notes, system schematics, or component arrangements.

b. FORMAT - The SSMD shall consist of a single line "road map" presentation for piping systems and a diagrammatic for major components.

c. DRAWING REFERENCE - Each SSMD shall contain references for associated drawings and diagrams, including standard vendor or detail drawings, for specified components and assemblies. The reference shall be located adjacent to the item identification.

d. IDENTIFICATION NUMBERS - Pressure boundary joints, linkage assemblies, castings requiring radiography and hull integrity fasteners in the piping system/major component shall have individual identification numbers assigned on the SSMD, as follows:

(1) JOINT IDENTIFICATION NUMBER - Individual identification numbers shall be assigned to pressure boundary joints (including component pressure boundary joints) and linkage assemblies. A single joint number shall be used to identify linkages (even though the linkage assembly may contain more than one joint).

(a) The joint identification number shall be shown on the schematic portion of the drawing and shall provide the following information (e.g., J5-ASW-1004):

1 - Joint Location on ship (e.g., J5)

2 - System (e.g., ASW)

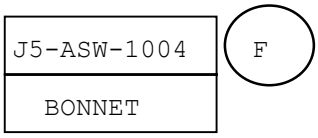
3 - Unique Serial Number (e.g., 1004)

(b) The joint number (e.g., J5-ASW-1004) shall be enclosed in a rectangle. Attached to the rectangle will be a circle containing one of the following letter codes identifying the type of joint:

F- Flanged
U- Union
S- Screw
L- Linkage
WB- Welded, Butt
WS- Welded, Socket
WA- Welded, Attachment
WR- Welded, Boss, Root Conn.
WL- Welded, Seal
WT- Welded, Support
WN- Welded, Nozzle
WF- Welded, Fillet
WM- Welded Bimetallic

(c) Component pressure boundary joints shall be identified by including a noun description in the rectangle as shown below. The joint letter codes identifying the type of joint (e.g., F,U,S) as identified above shall be included.

Example:



(d) For each drawing, a block of system joint serial numbers shall be assigned with the first serial number for a given system normally beginning with 1001 (e.g., ASW-1001, AHP-1001, etc.). The block of the numbers selected shall be large enough to allow for addition of new joints within a system and shall be identified on the drawing. This requirement may be satisfied by establishing an electronic accountability system to manage the assignment of SSMD joint numbers.

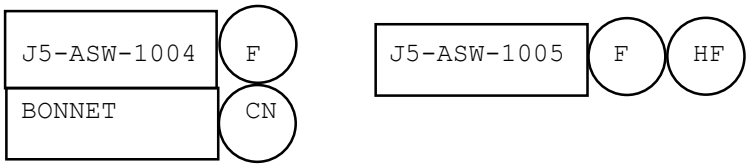
(e) The last joint number used shall be identified on the drawing and serial numbers of joints deleted shall be shown. This requirement may be satisfied by establishing an electronic accountability system to manage the assignment of SSMD joint numbers.

(2) COMPONENT IDENTIFICATION CODE - Component identification codes shall be assigned to castings requiring radiography and hull integrity fasteners.

(a) The following component identification codes, as applicable, shall be shown enclosed in a circle and located adjacent to the associated joint identification number.

CN - casting requiring RT
HF - hull integrity fastener

Examples:



(b) Where multiple joint identification numbers are associated with a casting requiring radiography, the component identification code shall be located adjacent to the lowest numbered joint.

(3) MATERIAL ITEM IDENTIFICATION - Individual identification shall be provided for each material item (pipe, fittings, valves, flexible connections, etc.) for piping systems and each pressure boundary part for major components within the SUBSAFE certification boundary as defined in sections 4.3, 4.4, and 4.5.

(a) Valves shall be identified in the schematic portion of the drawing by their system diagram valve number and the appropriate reference of the applicable installation drawing shall be indicated adjacent to the valve identification.

(b) Each individual piece of pipe shall be identified in the schematic portion of the drawing by the pipe number identification used on the appropriate piping detail or arrangement drawing(s) and shall identify the appropriate reference drawing(s). The appropriate piping reference drawing identified will be that drawing that identifies the individual piece of pipe identification number making up the pipe assembly or installation into the submarine.

(c) Fittings (e.g., elbow, flange, union, etc.) shall be identified in the schematic portion of the drawing by the fitting number used in the appropriate piping arrangement drawing and shall reference the appropriate reference drawing.

(d) Machinery or pressure vessel components shall be identified by diagram name (e.g., Auxiliary Sea Water Pump #1) and shall reference the applicable equipment or component drawing.

(4) The joint numbering system and component numbering system methodologies shall be specifically approved by the NAVSEA Program Manager's Office. Existing joint or component numbering systems need not be changed to meet these requirements.

e. MAJOR COMPONENT SSMDs - Major piping components and machinery or pressure vessel components not detailed on the System SSMD shall have a SSMD which provides the same joint and material identification requirements as system SSMDs.

f. IDENTIFICATION OF CHANGES - Design Yard and Shipbuilder changes which have not been incorporated into the associated reference drawing but affect the SSMD (e.g., physical arrangements of the graphics, material changes, joint attributes, or the addition or deletion of joints or material) shall be identified in a "Reference Change Table" on ship specific SSMDs.

g. PRESSURE HULL PENETRATION COMPOSITE DRAWING - Unless the following information is otherwise provided, such as a Figure in the SSCB Book, a pressure hull watertight boundary penetration composite drawing including a list of all piping, mechanical, and electrical penetrations requiring SUBSAFE certification, shall be developed. If penetrations that do not require certification are shown on the drawing, they shall be identified and marked NO CERTIFICATION REQUIRED in the list.

4.6.9.4.2 MAINTENANCE OF SUBSAFE MAPPING DRAWINGS (SSMDs).

SSMDs identifying the SUBSAFE Certification Boundary specified in Sections 4.3, 4.4, and 4.5, shall be maintained as follows:

a. For revision to existing SSMDs, the joint identification, material identification, and format methodology used to initially prepare the SSMD shall be used.

b. Any maintenance activity accomplishing SUBSAFE work shall annotate changes on the SSMD to reflect work accomplished and submit the changes to the NAVSEA designated activity (e.g., Design Yard or Planning Yard), for review, approval, and distribution in accordance with the appropriate NAVSEA Fleet Modernization Program Management and Operations Manual.

c. Any noted deficiency on the SSMD shall be identified, documented, and forwarded to the NAVSEA designated activity for resolution.

4.6.9.5 STEAM AND ELECTRIC PLANT MANUAL (SEPM)/SHIP SYSTEMS MANUAL (SSM).

These documents shall be maintained current in the SUBSAFE Certification Boundary. A copy of these documents reflecting the as-built or as-overhauled condition will be provided to the ship prior to Fast Cruise.

4.6.10 DOCUMENTATION REQUIRED FOR CERTIFICATION.

Objective Quality Evidence (OQE) documentation is needed to support the initial SUBSAFE certification of the newly constructed submarine and the continued maintenance of SUBSAFE certification. Complete documentation of all work within the SUBSAFE Boundary must be provided by the shipbuilder or maintenance activity, in a form suitable for audit, and maintained to permit traceability and verification of certification. This documentation shall consist of records (including drawings) required by this chapter and required by the referenced specifications, standards, and manuals within this chapter. See Appendix C for a more detailed summary of standard OQE required for certification.

4.6.10.1 REQUIREMENTS FOR RETENTION OF RECORDS.

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All records developed to support SUBSAFE certification shall be maintained and retrievable by the construction/maintenance activity for the life of the ship or as directed by NAVSEA in writing.

4.6.10.2 SUBMARINE MATERIAL CERTIFICATION REQUIREMENTS.

Written procedures implementing the requirements of this manual are required.

4.6.11 DESIGN YARD AND SHIPBUILDER SHIP'S EQUIPMENT DRAWINGS AND OTHER REQUIRED SUBSAFE CERTIFICATION DATA REQUIREMENTS.

The Design Yard and shipbuilders, in addition to the requirements invoked elsewhere in this manual, shall be responsible for the following items for new construction ships:

a. Develop Quality Assurance Data (QAD) for all the components/items and joints within the hull integrity boundary. For items procured as an assembly, individual pieces/parts are not required to be individually listed as QAD line items. This data shall be capable of being printed in the form of a tabular listing that identifies the applicable SUBSAFE attributes/requirements (e.g., Visual Inspection (VT), Radiographic Inspection (RT), Ultrasonic Inspection (UT), Magnetic Particle Inspection (MT), Liquid Penetrant Inspection (PT), Verification of Material (VM), Torque (TQ), Design Review (DR), Vital Equipment (VE)) for each item.

b. Indicate all SUBSAFE certification boundaries on the piping system diagrams or assembly drawings as applicable.

c. All SUBSAFE items and hull integrity items shall be readily identified in the Engineering Parts List.

d. The Ship's Drawing Index (SDI) shall identify all drawings that contain SUBSAFE items. Those drawings that contain SUBSAFE items shall be denoted "S" in the "SAFE" column. The SDI shall reflect all Technical Variance Documentation affecting drawings containing SUBSAFE items.

e. Vital Equipment (VE), SUBSAFE Design Review (SSDR), and Hull Integrity items shall be subject to the following controls:

(1) All items required for VE certification shall be so indicated in the SUBSAFE Code field of the Engineering Parts List (EPL) or database.

(2) All items within the SSDR boundary shall be so indicated in the SUBSAFE Code field of the EPLs or database.

(3) All items within the Hull Integrity Boundary shall be so indicated in the SUBSAFE Code field or other field of the EPLs. The Design Yard and shipbuilder shall have the capability of generating a list of all items within the hull integrity boundary from the EPL database. The list of Hull Integrity Boundary items shall be used in the execution of the one hundred percent (100%) review as required by Section 4.2.4 of this manual.

f. Indicate on the applicable drawings (diagrams, installation drawings, equipment drawings) the material control as required by NAVSEA 0948-LP-045-7010 and NAVSEA T9074-AD-GIB-010/1688. Those metallic parts and welds within the SUBSAFE Certification Boundary which are not covered by NAVSEA T9074-AD-GIB-010/1688 or NAVSEA 0948-LP-045-7010 shall have a material identification and control system in accordance with Section 4.6.6 of this manual.

g. Develop a SUBSAFE certification baseline program with supporting documents which identifies all SUBSAFE ship and equipment drawings and provides for the necessary reviews and analysis to ensure periodically that all SUBSAFE drawings meet all the certification attributes. Periodically means frequent enough to ensure all ships have a current SUBSAFE certification baseline at the time of Fast Cruise. This baseline shall be supported by regular internal audits of class ship's drawings, equipment drawings, test forms/data, and other SUBSAFE data as required to assure that the class design meets SUBSAFE requirements.

4.6.12 GOVERNMENT FURNISHED EQUIPMENT (GFE)/GOVERNMENT FURNISHED MATERIAL (GFM) CERTIFICATION REQUIREMENTS.

a. In addition to the design review requirements specified in paragraph 4.6.1, certain other certification requirements for GFE/GFM used within the SUBSAFE boundary must be met. Under the general definition of GFE/GFM, the following categories of material may be furnished to the shipbuilder, overhauling yard, or maintenance activity:

(1) GFE/GFM furnished by headquarters elements of the Navy (e.g., NAVSEA, SPAWAR, NAVSUP).

(2) GFE/GFM furnished by field elements of the Navy (e.g., NSWC-CD SSES, NUWC, SUBMEPP).

(3) GFE/GFM furnished under specifically established programs to provide long lead-time material which is normally procured by a shipyard.

(4) GFE/GFM furnished under prepackaged alteration programs (e.g., SHIPALTs, ORDALTs, etc.).

(5) GFE/GFM furnished under specifically established rotatable pool refurbishment programs (e.g., AERP, TRIPER).

b. The cognizant NAVSEA engineering directorate item manager/engineer shall ensure that all procurement contracts for GFE components clearly identify data deliverables necessary to certify applicable SUBSAFE attributes specified herein.

Vendor controls shall be in accordance with the requirements of Appendix E of NAVSEA 0948-LP-045-7010.

The GFE item manager/engineer shall designate an authorized certifying activity and ensure that the certifying activity concurs that deliverables specified are adequate for performing SUBSAFE certification.

c. All new and refurbished GFE/GFM intended for use within the SUBSAFE boundary shall be certified either directly by NAVSEA or by an authorized activity designated by NAVSEA. Certification shall be attested to by either a MIC number permanently marked on the item in accordance with Appendix D of NAVSEA 0948-LP-045-7010, by a statement signed and issued by the certifying activity, or by a completed re-entry form. For material attested to with a MIC number, evidence must accompany the material for which SUBSAFE attributes, where applicable, have been certified (e.g., SMIC "SS").

4.6.12.1 CERTIFICATION STATEMENT

Certification statements shall be equivalent to the following:

"All SUBSAFE certification attributes, inspections, and tests associated with the equipment/material have been satisfactorily met or accomplished in accordance with the Submarine Safety (SUBSAFE) Requirements Manual and invoked standards and specifications. The equipment/material is considered adequate for unrestricted operation to design test depth."

The statement shall be traceable to the material by referencing applicable unique identification numbers (e.g., serial numbers, MIC numbers) marked on the material. Certification statements shall be verified at receipt acceptance by the installing activity and shall be thereafter maintained and retrievable by the installing activity. DD Form 250s, 1348s, and 1149s are

not acceptable substitutes for certification statements. However, certification statements may be provided on these documents.

4.6.12.2 CERTIFICATION STATUS.

Material without adequate documented evidence to certify GFE/GFM shall not be installed until a satisfactory resolution is provided. Certification status of GFE/GFM will be determined as follows:

a. Installing activities shall maintain accountability of all GFE/GFM to ensure certified components are received and installed. The installing activity shall submit to NAVSEA a list of any GFE/GFM requiring SUBSAFE certification for which SUBSAFE certification has not been accomplished or for which SUBSAFE certification statements are not available. NAVSEA will review the list to ensure its accuracy and will initiate action to conduct the necessary research and design analysis to establish the certification status of previously uncertified items. This may include directing the installing activity to accomplish any required action to complete certification of a particular item.

b. Overall responsibility for accomplishing certification of individual submarines is assigned to the installing activities. Where installing activities find that adequate documented evidence is not available to certify GFE/GFM, a report of such findings and any recommended actions shall be forwarded to NAVSEA for follow-up action.

SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

CHAPTER 5

SUBSAFE CERTIFICATION PROCESS

5.1 PURPOSE.

Chapter 5 provides the process to be followed for SUBSAFE certification. The certification process ensures SUBSAFE program requirements have been met and provides the sequence normally required to certify a ship for unrestricted operations to test depth. Reactor plant SUBSAFE certification documentation shall be maintained and controlled by NAVSEA 08.

Initial steps in SUBSAFE certification of new construction submarines begin with development of shipbuilding specifications and planning documents. The specifications must include the SUBSAFE requirements delineated in this manual. NAVSEA provides Government Furnished Equipment (GFE), approved SUBSAFE Certification Audit Plans (SSCAPs), SUBSAFE Certification Boundary (SSCB) Books and other documentation to support the SUBSAFE program. In the test and trials stage, numerous interrelated actions occur which lead to SUBSAFE certification for sea trials and unrestricted operations to test depth.

The process for maintaining SUBSAFE certification of previously SUBSAFE certified submarines completing a major depot availability differs from initial SUBSAFE certification of new construction submarines. At initiation of the major depot availability planning stage, NAVSEA and the TYCOM will use this manual to determine the scope of work required to maintain SUBSAFE certification. The scope of work includes Type Commander identified work packages, Unrestricted Operations Maintenance Requirement Cards (URO/MRCs), changes to ship configuration (SHIPALTs, ORDALTs), SUBSAFE material condition assessment, and resolution of outstanding waivers. During the actual major depot availability stage, NAVSEA, if required, provides the depot activity with GFE which is certified to meet the SUBSAFE requirements. Regardless of whether the facility is a NAVSEA or TYCOM field activity the basic SUBSAFE certification process shall be adhered to and this manual referred to for any SUBSAFE certification action.

5.2 NEW CONSTRUCTION SUBSAFE CERTIFICATION.

The process for SUBSAFE certification of new construction submarines begins in the design stage of the procurement program and continues through the construction and test and trials stages.

5.2.1 DESIGN STAGE.

The initial steps in the SUBSAFE certification of new construction submarines begin with the development of shipbuilding specifications and planning documents by NAVSEA. These specifications include, as a minimum, the SUBSAFE requirements delineated in this manual. The Design Yard, using the NAVSEA approved specifications, provides the detail design for the new submarine (class or individual ship).

5.2.2 CONSTRUCTION STAGE.

The construction stage commences with the award of the construction contract. During construction, the shipbuilder is provided with GFE which is certified by NAVSEA to meet the SUBSAFE certification requirements. NAVSEA also

supplies the shipbuilder with GFI that supports the SUBSAFE Program, such as the approved SSCAP, SSCB Book, etc.

5.2.2.1 ORGANIZATION ACTIONS.

Throughout the construction of the submarine, the numerous organizations involved take action to ensure that the ship is designed and constructed in accordance with the requirements of this manual as implemented by the shipbuilding contract and detail specifications. Among these actions are:

a. In-process quality assurance by the shipbuilder (MIL-Q-9858).

b. Internal quality audits by the shipbuilder and Supervising Authority.

c. Functional and other types of audits conducted by NAVSEA.

d. Development of the individual ship SSCAP (if required) and Selected Record Drawings/Data (SRD/D) by the shipbuilder, based on the approved class certification material documents, with review and approval as specified in this manual.

e. Completion of the SUBSAFE design review by the shipbuilder, based on the differences from an approved class baseline with review by the Supervising Authority and approval by NAVSEA.

f. Internal SUBSAFE Certification Audit (SSCA) by the Supervising Authority as a prerequisite to the NAVSEA SSCA.

g. Submission by shipbuilder of the Sea Trial Agenda(s), Deep Dive Test Form, and Emergency Main Ballast Tank Blow Test Procedure to the Supervising Authority for forwarding to and approval by NAVSEA; the TYCOM shall also concur in the operational aspects of the Sea Trial Agenda(s).

h. Completion of the NAVSEA SSCA.

i. Satisfactory completion of Salvage Inspection by TYCOM.

j. Satisfactory resolution of all NAVSEA SSCA recommendations.

k. Certification that all SUBSAFE work is completed satisfactorily for supporting unrestricted operations to test depth.

l. Re-entry control procedures are invoked after shipyard inspection validates that a system, equipment, or a portion thereof, has been built per plan.

5.2.3 TEST AND TRIALS STAGE.

The shipbuilder shall conduct tests and trials to verify that the newly constructed submarine performs as designed. The general sequence of events and the interrelated SUBSAFE certification actions accomplished by the activities involved, leading to sea trials and SUBSAFE certification for unrestricted operations to test depth, are discussed in Section 5.6, shown in Table 5-1 and are summarized as follows:

a. Internal SSCA by Supervising Authority.

b. SSCA by NAVSEA.

c. Accomplishment of Salvage Inspection by TYCOM.

d. Resolution of NAVSEA SSCA Category I recommendations.

e. Supervising Authority sends message to NAVSEA, in advance of the scheduled start of Fast Cruise stating the status of all incomplete NAVSEA SSCA Category IA recommendations, that all SUBSAFE work necessary for sea trials, including resolution of all NAVSEA SSCA Category I recommendations, has been completed and that the ship is ready for commencement of Fast Cruise. The message shall also state that there are no conditional SUBSAFE Deviations or Waivers which have not been satisfied or cite those that exist, and that, subject to satisfactory completion of Fast Cruise and resolution of mandatory deficiencies, the SUBSAFE material condition of the ship is satisfactory for commencement of Alpha Sea Trials.

f. Verification by TYCOM to NAVSEA prior to Fast Cruise of crew readiness for underway trials.

g. NAVSEA message to the TYCOM certifying that the material condition of the submarine is satisfactory for sea trials and controlled dives to specified percent of test depth.

h. Accomplish Fast Cruise.

i. Resolution of Fast Cruise deficiencies.

j. Supervising Authority sends message to NAVSEA and TYCOM stating satisfactory completion of Fast Cruise.

k. TYCOM message to ship authorizing controlled dives to specified percent of test depth.

l. Accomplish Alpha Sea Trials.

m. Supervising Authority sends message to NAVSEA stating satisfactory completion of builder's Alpha Sea Trials, satisfactory resolution of any Ship's Force RECs, and status of all incomplete NAVSEA SSCA Category IA recommendations, and reporting the SUBSAFE material condition of the submarine is satisfactory for Bravo Sea Trials. The routine is repeated for subsequent sea trials.

n. NAVSEA message to TYCOM certifying that the SUBSAFE material condition of the submarine is satisfactory for Bravo Sea Trials to test depth. The routine is repeated for subsequent sea trials for SUBSAFE work only.

o. TYCOM message to ship authorizing controlled dives to test depth.

p. Supervising Authority sends message to NAVSEA stating satisfactory completion of all builder's sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, satisfactory resolution of any Ship's Force RECs, resolution of all NAVSEA SSCA Category IA recommendations, and reporting the SUBSAFE material condition of the submarine is satisfactory for unrestricted operations to test depth.

q. NAVSEA message (initial certification) to TYCOM certifying that the SUBSAFE material condition of the submarine is satisfactory, and recommending unrestricted operations to test depth.

r. TYCOM message to ship authorizing unrestricted operations to test depth.

5.3 LIFE CYCLE SUBSAFE CERTIFICATION.

Following initial SUBSAFE certification by NAVSEA, the TYCOM is responsible for sustaining SUBSAFE certification of the ship in accordance with the requirements of this manual for the life of the ship. The underlying principles for sustaining certification on individual systems and components are: (1) all work within the SUBSAFE Certification Boundary will be accomplished in accordance with the requirements of this manual and (2) all URO/MRCs shall be accomplished within required periodicities.

For major depot availabilities performed by activities under NAVSEA management or contract administration, NAVSEA will be responsible for the SUBSAFE certification of those portions of the work performed by NAVSEA or NAVSEA administered contract activities. For availabilities in which work is performed by activities other than those under TYCOM cognizance, the TYCOM may request, prior to commencement of the availability, NAVSEA to provide SUBSAFE certification of the work accomplished by those activities. Sustaining SUBSAFE certification of all systems and components not worked by a NAVSEA activity or NAVSEA administered contract during such availabilities is the responsibility of the TYCOM. For major depot availabilities, upon receipt of NAVSEA SUBSAFE certification, and after determining that all URO/MRCs are current and that the SUBSAFE certification of systems and components not covered by NAVSEA SUBSAFE certification is sustained, the TYCOM will issue a message to the ship that reports proper SUBSAFE certification of NAVSEA and TYCOM responsible areas, confirms that the status of the SUBSAFE Certification Boundary is satisfactory for operation to design test depth, and authorizes unrestricted operations to a specified depth.

5.4 MAJOR DEPOT AVAILABILITY SUBSAFE CERTIFICATION.

The process for maintaining SUBSAFE certification of previously SUBSAFE certified submarines completing a major depot availability differs from that of initially SUBSAFE certifying new construction submarines.

a. The major depot availability SUBSAFE certification process, like a new construction SUBSAFE certification process, consists of three major stages:

(1) Planning Stage.

(2) Major Depot Availability Stage.

(3) Test and Trials Stage.

b. During each stage, numerous SUBSAFE certification related actions are taken by all activities to ensure maintenance of the SUBSAFE certification of the submarine undergoing a major depot availability.

5.4.1 PLANNING STAGE.

At the initiation of the planning stage, NAVSEA and the TYCOM shall utilize this manual in developing the scope of the work required to maintain SUBSAFE certification.

The TYCOM shall provide copies of all outstanding SUBSAFE departures to the shipyard for review. The shipyard will provide TYCOM the results of this review with recommendations for additional work package actions.

5.4.2 MAJOR DEPOT AVAILABILITY STAGE.

The major depot availability stage commences with the award of the major depot availability contract/project order or major depot availability assignment by CNO. During the major depot availability, NAVSEA provides GFE, which is certified to meet the SUBSAFE requirements.

5.4.2.1 ORGANIZATION ACTIONS.

Throughout the major depot availability stage, actions shall be taken to ensure that all required SUBSAFE work is performed in accordance with this manual as implemented by the work package. Among these actions are:

a. Re-entry control procedures implemented in accordance with Chapter 6 of this manual.

b. In-process quality assurance by the depot activity.

c. Internal quality audits by the Supervising Authority.

d. Functional and other types of audits of depot activities by NAVSEA.

e. Development (or update, as required) of the individual ship SSCAP and SRD/D by the depot activity, based on the approved class certification material documents, with review and approval as specified in this manual.

f. Completion of required SUBSAFE design review by the planning yard and depot activity with audit by the Supervising Authority and approval by NAVSEA.

g. Internal SSCA by Supervising Authority as a prerequisite to the NAVSEA SSCA.

h. Submission by Supervising Authority to NAVSEA of Sea Trial Agenda for concurrence and the Deep Dive Test Form and Emergency Main Ballast Tank Blow Test Procedures (URO/MRC 022) for approval; the TYCOM shall approve the Sea Trial Agenda.

i. Completion of NAVSEA SSCA.

j. Satisfactory completion of Salvage Inspection by TYCOM.

k. Satisfactory resolution of all NAVSEA SSCA recommendations.

l. Certification that all SUBSAFE work is completed satisfactorily for supporting unrestricted operations to test depth.

m. Accomplishment of scheduled URO/MRC actions in accordance with Chapter 6 of this manual.

5.4.3 TEST AND TRIALS STAGE.

The depot activity shall conduct tests and trials to verify that the submarine performs as designed. The sequence of events and the interrelated SUBSAFE certification actions accomplished by the activities involved, leading to sea trials and certification for unrestricted operations to test depth, are discussed in Section 5.6, shown in Table 5-1 and are summarized as follows:

a. Internal SSCA by Supervising Authority.

b. SSCA by NAVSEA.

c. Accomplishment of Salvage Inspection by TYCOM.

d. Resolution of NAVSEA SSCA Category I recommendations.

e. Supervising Authority sends message to NAVSEA and TYCOM, in advance of the scheduled start of Fast Cruise, stating status of all incomplete NAVSEA SSCA Category IA recommendations and certifying that the material condition of those parts of the ship installed, repaired and/or tested by the depot activity are satisfactory for post repair sea trials. The message shall also state that all work performed by the depot activity necessary for sea trials, including resolution of all NAVSEA SSCA Category I recommendations, has been completed, and that the ship is ready for commencement of Fast Cruise. The message shall also state that there are no conditional SUBSAFE Deviations or Waivers which have not been satisfied or cite those that exist, and, subject to the satisfactory completion of Fast Cruise and resolution of mandatory deficiencies, the material condition is satisfactory for commencement of sea trials. The report is repeated for SUBSAFE work only for follow-on sea trials without reference to Fast Cruise.

f. TYCOM verification of crew readiness for underway trials prior to Fast Cruise.

g. NAVSEA message to the TYCOM certifying that the SUBSAFE material condition of those parts of the ship installed, repaired and/or tested by the depot activity is satisfactory for sea trials and controlled dives to test depth . The routine is repeated for follow-on sea trials.

h. TYCOM validation that SUBSAFE certification of remainder of items in the certification boundary has been sustained.

i. Accomplish Fast Cruise.

j. Resolution of Fast Cruise deficiencies.

k. Supervising Authority sends message to NAVSEA and TYCOM stating satisfactory completion of Fast Cruise.

l. TYCOM message to ship, with copies to Chief of Naval Operations and NAVSEA, stating that the status of the SUBSAFE Certification Boundary is satisfactory for trials to test depth and authorizing controlled dives to specified depth. The routine is repeated for follow-on sea trials.

m. Supervising Authority sends message to NAVSEA stating satisfactory completion of all sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, resolution of all NAVSEA SSCA Category IA recommendations, identifying any deferred SUBSAFE work and/or conditionally approved Deviations and Waivers, and reporting the SUBSAFE material condition of those parts of the submarine installed, repaired, and/or tested by the depot activity is satisfactory for unrestricted operations to test depth.

n. NAVSEA message to TYCOM certifying that the SUBSAFE material condition of those parts of the ship installed, repaired, and/or tested by the depot activity is satisfactory, and recommending authorization for unrestricted operations to test depth subject to TYCOM verification that SUBSAFE certification has been sustained.

o. TYCOM verify that SUBSAFE certification of areas outside of depot work package has been sustained.

p. TYCOM message to ship, with copies to Chief of Naval Operations and NAVSEA, stating that the status of the SUBSAFE Certification Boundary is satisfactory for unrestricted operations to design test depth and authorizing unrestricted operations to a specified depth.

5.5 SUBSAFE AUDITS.

NAVSEA is responsible for the adequacy and accuracy of all technical documentation issued by NAVSEA and any NAVSEA managed field activity. This same responsibility applies to NAVSEA provided GFE and material or work performed by NAVSEA or any NAVSEA managed field activity. NAVSEA managed field activities and NAVSEA contractors responsible for SUBSAFE technical documentation, material or work are required to maintain quality assurance programs. Contractors are required to maintain a program which complies with MIL-Q-9858, MIL-I-45208, ISO-9001, or ISO-9002, as applicable. NAVSEA activities are required to comply with NAVSEA directives which are designed to provide similar results. Each activity, whether public or private, performs audits of various types, all of which are designed to ensure compliance with imposed requirements.

5.5.1 NAVSEA AUDITS.

NAVSEA shall use Functional, Vertical, Overview, and SUBSAFE Certification Audits to ensure compliance with SUBSAFE requirements. Other types of audits may be used when special circumstances so dictate.

5.5.1.1 FUNCTIONAL AUDITS.

NAVSEA functional audits are designed to review processes, controls, procedures, and associated functions used to perform specific SUBSAFE related tasks. In most cases, they are not oriented to a specific ship but are intended to determine how the factors being audited impact SUBSAFE work and the resultant condition for any material or equipment.

NAVSEA, at its discretion, will perform a periodic functional audit of any activity that is responsible for performing SUBSAFE work. This audit is designed to review many functional areas simultaneously. It provides all levels of management at the activity with an independent, objective, and constructive evaluation of the effectiveness and efficiency with which quality assurance and control responsibilities are being implemented and followed. These audits will be used to determine if an activity is qualified to perform SUBSAFE related design, construction, maintenance, or repair functions. Follow-up audits will confirm that corrective and preventive action has been implemented.

5.5.1.2 VERTICAL AUDITS.

Vertical audits are an intensive examination of the documentation that was used to SUBSAFE certify components from receipt through final disposition (e.g. removal from system, repair/replacement, shop testing, reinstallation in the system, and post-installation testing). This type of audit may be used to verify the validity of technical data as well as hardware. NAVSEA may use this audit technique alone or in conjunction with functional or certification audits as the situation may dictate.

5.5.1.3 OVERVIEW AUDITS.

Overview audits are reviews of audits performed by another activity or organization. They are used to determine the adequacy (both breadth and depth) of the area covered, to determine the SUBSAFE implication of any findings, and to determine if all required corrective actions have been

identified. NAVSEA will use this type of audit to assess the adequacy of quality assurance and quality control programs at the activity being reviewed.

5.5.1.4 SUBSAFE CERTIFICATION AUDITS (SSCAs).

SSCAs are performed on an individual ship basis to provide assurance that the material condition of that submarine for systems and components worked by NAVSEA managed activities is satisfactory for unrestricted operations to test depth.

5.5.1.4.1 SCHEDULING REQUIREMENTS.

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For new construction ships, prior to the ship becoming waterborne, a Pre-Launch (Phase I) SSCA may be conducted at NAVSEA's option and the shipbuilder's request. The scope of the Phase I audit is usually limited to a review of the radiographic film for those SUBSAFE items that would be underwater when the submarine is initially launched.

Prior to the start of the NAVSEA full SSCA on any submarine, the following guidelines shall be satisfied:

a. CRITICALITY TESTING STATUS. Criticality testing is scheduled.

b. RE-ENTRY CONTROL FORM (REC) STATUS. As a minimum, no more than 5% of all RECs issued during the availability are outstanding. The REC is considered complete when all work, testing, and verification signatures have been completed and there are no outstanding actions that were transferred to an alternative accountability system.

c. DESIGN REVIEW STATUS. The initial Design Review Report is assembled and submitted to NAVSEA.

d. URO/MRC STATUS. All applicable URO/MRCs, with the exception of URO/MRCs 022 and 029, are completed and the reports required to be submitted to NAVSEA and SUBMEPP at the time of the audit are submitted.

e. SEA TRIAL AGENDA STATUS. The Sea Trial Agenda, Deep Dive Test Form, and EMBT Blow Test Form are submitted to NAVSEA.

f. INTERNAL AUDIT STATUS. The Internal SSCA is completed and submitted in accordance with item c. of paragraph 5.5.2.3 or 5.5.3.3, as applicable.

g. TEST FORM STATUS. Testing within the SUBSAFE Certification Boundary satisfies the following requirements:

(1) 100% of the strength, tightness, and SUBSAFE operational testing for the following SUBSAFE systems is completed, reviewed, and accepted:

(a) Main Sea Water.

(b) Auxiliary Sea Water.

(c) Normal and Emergency MBT Blow.

(d) Sea-connected Emergency Flood Control System.

(e) Steering and Diving Hydraulics.

(2) 100% of the strength and tightness testing for the following SUBSAFE items is completed, reviewed, and accepted:

(a) All Hull and Back-up valves excluding those removed to provide shore services.

(b) Torpedo Tubes and Torpedo Tube Flood and Drain.

(c) Trash Disposal Unit.

(d) Internal Countermeasure Launcher/Signal Ejector/Internal Auxiliary Launcher.

(e) Missile Tubes.

(3) For testing not covered by items g.(1) and g.(2) above, at least 80% of the SUBSAFE portion of each and every strength and tightness (and if applicable, drop or flushing) test shall be completed.

(4) For testing not covered by items g.(1) and g.(2) above, at least 70% of the SUBSAFE portion of each and every SUBSAFE operational test and inspection shall be completed except for the following:

(a) Salvage Inspection.

(b) Access to and Operation of Vital Equipment.

(c) Compartment and Escape Trunk Tightness Tests.

5.5.1.4.2 DOCUMENTATION REQUIRED FOR SUBSAFE CERTIFICATION AUDITS.

Lists and data (or a computer program equivalent) for items within the SUBSAFE Certification Boundary shall be developed by the shipbuilder or overhaul facility and shall be available for use during NAVSEA SUBSAFE Certification Audits. These lists shall provide data to the level required by Section 4.6.11. The Class SUBSAFE Certification Audit Plan (SSCAP) shall indicate the class-specific lists and data required to support the audits. Any list can be requested as long as it can be provided by the contractor’s database: As a minimum, the following shall be available:

a. List of Flexible Connectors (not applicable to post-SSN 21 Class submarines). (see note below)

b. List of Brazed Pipe Joints (not applicable to post-SSN 21 Class submarines). (see note below)

c. List of Castings Requiring Radiographic Inspection. (see note below)

d. List of Hull Integrity Fasteners. (see note below)

e. Test Forms for H.P. Air and Emergency Main Ballast Tank Blow System.

f. Test Forms for Flooding Control System, Remote Operation of Hydraulic Operated Sea-connected Valves.

g. Test Forms for Access to Vital Equipment.

h. Test forms for Diving Plane System Reliability.

i. SUBSAFE Test Forms.

j. Drawings, SHIPALTs, ORDALTs, Departures from Specifications, etc., which initiate changes either to or within the SUBSAFE Certification Boundary.

k. List of SUBSAFE Selected Record Drawings.

l. List of Government Furnished Material (GFM) (SSN 21 Class and later only).

m. List of Welded Pipe and Welded Component Installation Joints. (see note below)

n. List of Design Review Hangers. (see note below)

o. List of Hull Integrity Plates. (see note below)

p. List of Welded Structural Joints. (see note below)

q. List of Wrought Material. (see note below)

r. List of Mechanical and Mechanical Component Installation Joints. (see note below)

NOTE

For post new construction availabilities, identify only newly installed items or those existing items worked during the availability.

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5.5.1.4.3 RESPONSIBILITIES.

Specific NAVSEA SUBSAFE responsibilities for new construction, major depot availabilities, or submarines in upkeep are:

a. Specify the requirements for the SSCAP to be used for a specific submarine, identifying areas which are subject to audit prior to NAVSEA certifying the material condition of the submarine for sea trials.

b. Provide the NAVSEA SSCA Team:

(1) The audit team will normally be composed of representatives from designated technical branches within NAVSEA 05, Program Manager Offices, NAVSEA 04, personnel from other shipyards, and other personnel responsible for implementing SUBSAFE requirements. A NAVSEA 92Q representative shall serve as the audit Team Leader.

(2) The duties of the NAVSEA Audit Team Leader shall be to assemble the audit team, assign areas of coverage, supervise the audit, prepare the audit report, and conduct an exit critique.

c. Conduct a full SSCA of the specific submarine (new construction for initial certification or major depot availability for maintaining certification).

(1) NAVSEA may elect to conduct more than one SSCA. For example, if initial audit results so warrant or if excessive delays occur between the initial audit and Fast Cruise, NAVSEA will review the need for additional audits and will schedule reaudits accordingly.

(2) For NAVSEA managed new construction availabilities, following initial URO certification by NAVSEA, where the scope and/or volume of SUBSAFE work performed would not warrant an SSCA by NAVSEA, NAVSEA may elect to delegate, on a ship-by-ship basis, the availability SSCA to SUPSHIP.

d. Advise the Supervising Authority, the ship's Commanding Officer or Officer In Charge, the TYCOM, and the Fleet Commander of the SSCA recommendations.

e. SSCA findings shall be recorded on a SSCA Form (see Figure 5-1) and the associated recommendations categorized as follows:

(1) Category I - Recommendations of such importance that their resolution to NAVSEA's satisfaction is required prior to the start of Fast Cruise to ensure the material condition of the SUBSAFE systems and components is verified as satisfactory for an orderly transition to sea trials.

(2) Category IA - Recommendations which, while not mandatory for resolution prior to sea trials, are of such importance that their resolution to NAVSEA's satisfaction is required to ensure the material condition of the SUBSAFE systems and components is satisfactory prior to NAVSEA recommending authorization for unrestricted operations to test depth.

(3) Category II - Recommendations which, while not mandatory for resolution prior to either sea trials or NAVSEA's recommending authorization for unrestricted operations to test depth, are of such importance that satisfactory resolution will result in increased assurance of SUBSAFE. These recommendations will be resolved to NAVSEA's satisfaction in a timely manner.

(4) Category IIA - Recommendations which, while not mandatory for resolution prior to completion of the availability, identify systemic weaknesses in or nonconformance with the SUBSAFE Program at the activity. These recommendations must be resolved by determining the root cause of the weakness or nonconformance and taking appropriate corrective and preventive action while ensuring that current availabilities are not adversely affected by the same systemic weakness or nonconformance. These recommendations will be resolved to NAVSEA's satisfaction in a timely manner.

(5) Category III - Recommendations for areas audited and found acceptable.

f. The Audit Team Leader shall submit the SSCA report via NAVSEA 92Q to the applicable Program Manager Office within three working days from completion of the audit.

g. NAVSEA may assume SUBSAFE audit and certification responsibility, in accordance with Section 5.4, for Major Depot Availabilities of less than 6 months. The following process will be used in determining when NAVSEA or TYCOM is to designate an availability of less than 6 months as a Major Depot Availability. NAVSEA may review Availability Work Packages and New Construction PSA work lists for availabilities scheduled in excess of 60 days and make recommendations to the applicable Program Manager and TYCOM on those availabilities which warrant NAVSEA assuming certification authority for depot SUBSAFE work. This recommendation will be based on the scope and/or volume of depot SUBSAFE work authorized. The scope of the audit will be based on an SSCAP tailored for the SUBSAFE work assigned to the depot(s).

h. NAVSEA will conduct, at the request of the TYCOM, audits of submarines completing availabilities (e.g., Selected Restricted Availabilities (SRAs)) at Intermediate Maintenance Activities (IMAs) and ship repair facilities. These audits will be reduced in scope from New Construction/Major Depot Availability SSCAs. Also upon request from TYCOM(s), NAVSEA will conduct periodic audits of TYCOM's SUBSAFE program work and provide assistance to support SUBLANT/SUBPAC SUBSAFE and quality assurance audit programs.

NAVSEA SUBSAFE CERTIFICATION AUDIT (SSCA)

SHIP NAME (HULL NUMBER)

ITEM NO.: _____ AUDITOR: _____

CATEGORY: _____ REVIEWED WITH: _____

SAMPLE SIZE: _____ DATE: _____

BRIEF:

FINDING:

DISCUSSION/REQUIREMENTS:

RECOMMENDATION:

CORRECTIVE ACTION TAKEN:

_____ _____

SIGNATURE/DATE SUBSAFE DIRECTOR/DATE

_____

ACCEPTED BY: _____ _____ _____

SHIP'S PROJECT ENGR. PROGRAM MANAGER SEA 92Q
TECHNICAL DIRECTOR

PAGE NO. ___

FIGURE 5-1 SUBSAFE CERTIFICATION AUDIT (SSCA) FORM

5.5.2 SUPERVISING AUTHORITY AUDITS (PRIVATE SHIPYARDS).

The Supervising Authority is responsible for reviewing and evaluating the private shipyard's system for the control of material and fabrication in all phases of submarine construction, major depot availability, and repair. Quality Assurance program instructions are contained in NAVSEA 0900-LP-079-6010 and in NAVSEA 0900-LP-079-5010.

5.5.2.1 FUNCTIONAL AUDITS.

Periodic functional audits shall be conducted to determine the private shipyard's compliance with the requirements of this manual. These audits shall be conducted at least annually and are subject to review by NAVSEA. Problem areas identified during these audits shall be re-audited within 90 days to verify that corrective actions have been implemented and have solved the identified problem.

5.5.2.2 VERTICAL AUDITS.

Vertical audits are an intensive examination of the documentation that was used to SUBSAFE certify components from receipt through final disposition (e.g., procurement, removal from system, shop testing, installation in the system, and post-installation testing). This type of audit will be used to verify the validity of technical data as well as hardware. The Supervising Authority will use this audit technique alone or in conjunction with internal certification and functional audits.

5.5.2.3 SUBSAFE CERTIFICATION AUDITS (SSCAs).

The Supervising Authority's responsibilities prior to, during, and subsequent to the NAVSEA SSCA are as follows:

a. Three months prior to the first scheduled builder's or post-major depot availability sea trials, recommend dates to NAVSEA for the NAVSEA SSCA. The NAVSEA SSCA shall be scheduled to start after the guidelines of section 5.5.1.4.1 have been satisfied. Requests to schedule, or change the schedule of, a NAVSEA SSCA must be accompanied by the current status of items a. through g. of paragraph 5.5.1.4.1. Requests for deviation from these guidelines will be handled on a case by case basis and will be specifically approved by NAVSEA 92Q.

b. Prior to the NAVSEA SSCA, conduct an Internal SSCA that covers all elements of the individual ship's SSCAP. Report the findings of this audit in a format equivalent to that utilized by NAVSEA (Figure 5-1). Issue the audit report and identify recommendations to the private shipyard and ensure corrective action is initiated prior to the NAVSEA SSCA.

c. Forward the Internal SSCA report to the Program Manager's Office for review and comment with a copy to NAVSEA 92Q. The audit report shall arrive at NAVSEA no later than one week prior to the scheduled start of the NAVSEA SSCA.

d. Upon resolution of recommendations resulting from the NAVSEA SSCA, copies of the applicable audit pages with appropriate supporting documentation shall be forwarded to NAVSEA for review and acceptance as follows:

(1) Responses to Category I recommendations shall be forwarded, as a rule, to NAVSEA at least seven days prior to commencement of Fast Cruise. Responses to Category I recommendations that are related to time sensitive

issues (e.g., waivers and deviations, incomplete work, and RECs) may be submitted closer to Fast Cruise than seven days.

(2) Responses to Category IA recommendations shall be forwarded to NAVSEA prior to requesting certification for unrestricted operations to test depth.

(3) Responses to Category II recommendations shall be forwarded to NAVSEA in a timely manner.

(4) Responses to Category IIA recommendations shall be forwarded to NAVSEA in a timely manner.

e. Provide NAVSEA copies of NAVSEA SSCA Category II recommendations, annotated to reflect completion of corrective action. Submittal of this information is not tied to a specific ship event.

f. Provide copies of NAVSEA SSCA Category IIA recommendations, annotated to reflect satisfactory corrective or preventive action taken or other resolution, to NAVSEA for review and acceptance. Submittal of this information is not tied to a specific ship event.

5.5.2.4 AUDITS OF TYCOM MANAGED AVAILABILITIES WITH FORMAL WORK PACKAGES.

Work on SUBSAFE components performed by the depot activity shall be audited by the Supervising Authority, as specified in the contract or availability work package. These audits shall be designed to validate that all work performed complies with the requirements of this manual.

5.5.2.5 AUDITS OF TYCOM MANAGED AVAILABILITIES WITHOUT FORMAL WORK PACKAGES.

Where audits of depot activity work performed on SUBSAFE components are not specifically required by the contract, the activity’s functional audits, carried out in accordance with paragraph 5.5.2.1, shall be the basis for ensuring that the processes used in accomplishing the work comply with the requirements of this manual.

5.5.3 SUPERVISING AUTHORITY AUDITS (PUBLIC SHIPYARDS).

The Supervising Authority is responsible for reviewing and evaluating the shipyard's system for the control of material and fabrication in all phases of submarine construction, major depot availability and repair. Quality assurance program instructions are contained in NAVSEA TL-855-AA-STD-010.

5.5.3.1 FUNCTIONAL AUDITS.

NAVSEA TL-855-AA-STD-010 requires the Supervising Authority to conduct internal functional audits. These audits, in part, determine the shipyard's compliance with this manual. In-process audits of selected SUBSAFE components (see paragraph 5.5.3.2 below) shall also be conducted in conjunction with functional audits where such audits have not been otherwise conducted during the preceding year. The shipyard shall also conduct an annual review of their compliance with the SUBSAFE Program. This review shall address, as a minimum, the following seven functional areas: Management, Quality Assurance, Material Control, Technical, Re-entry Control, Testing, and Planning. This review should be based on, but not limited to, the results of the internal functional audit program in these areas. In addition, the shipyard shall develop an assessment of their compliance with the SUBSAFE Program and present it to NAVSEA at the start of the NAVSEA functional audit. When required by NAVSEA,

the shipyard shall perform vertical audits and personnel knowledge assessments in conjunction with the internal functional audits.

5.5.3.2 VERTICAL AUDITS.

Vertical audits are an intensive examination of the documentation that was used to SUBSAFE certify components from receipt through final disposition (e.g., procurement, removal from system, shop testing, installation in the system, and post-installation testing). This type of audit will be used to verify the validity of technical data as well as hardware. The Supervising Authority will use this audit technique alone or in conjunction with internal certification and functional audits.

5.5.3.3 SUBSAFE CERTIFICATION AUDITS (SSCAs).

The Supervising Authority's responsibilities prior to, during, and subsequent to the NAVSEA SSCA are as follows:

a. Three months prior to the first scheduled builder's or post-major depot availability sea trial, recommend dates to NAVSEA for the NAVSEA SSCA. The NAVSEA SSCA shall be scheduled to start after the guidelines of section 5.5.1.4.1 have been satisfied. Requests to schedule or reschedule must be submitted in writing to NAVSEA 92Q a minimum of 15 working days prior to the requested audit date. All requests must be accompanied by the current status of items a. through g. of paragraph 5.5.1.4.1.

b. Prior to the NAVSEA SSCA, conduct an Internal SSCA that covers all elements of the individual ship's SSCAP. Report the findings of this audit in a format equivalent to that utilized by NAVSEA (Figure 5-1). Issue the audit report and identify recommendations to the public shipyard and ensure corrective action is initiated prior to the NAVSEA SSCA.

c. Forward the Internal SSCA report to the Program Manager's Office for review and comment with a copy to NAVSEA 92Q. The audit report shall arrive at NAVSEA no later than one week prior to the scheduled start of the NAVSEA SSCA.

d. Upon resolution of recommendations resulting from the NAVSEA SSCA, copies of the applicable audit pages with appropriate supporting documentation shall be forwarded to NAVSEA for review and acceptance as follows:

(1) Responses to Category I recommendations shall be forwarded, as a rule, to NAVSEA at least seven days prior to commencement of Fast Cruise. Responses to Category I recommendations that are related to time sensitive issues (e.g., waivers and deviations, incomplete work, and RECs) may be submitted closer to Fast Cruise than seven days.

(2) Responses to Category IA recommendations shall be forwarded to NAVSEA prior to requesting certification for unrestricted operations to test depth.

(3) Responses to Category II recommendations shall be forwarded to NAVSEA in a timely manner.

(4) Responses to Category IIA recommendations shall be forwarded to NAVSEA in a timely manner.

e. Provide NAVSEA copies of NAVSEA SSCA Category II recommendations, annotated to reflect completion of corrective action. Submittal of this information is not tied to a specific ship event.

f. Provide copies of NAVSEA SSCA Category IIA recommendations, annotated to reflect satisfactory corrective or preventive action taken or other resolution, to NAVSEA for review and acceptance. Submittal of this information is not tied to a specific ship event.

5.5.3.4 AUDITS OF TYCOM MANAGED AVAILABILITIES WITH FORMAL WORK PACKAGES.

Work on SUBSAFE components performed by the depot activity shall be audited by the Supervising Authority as specified in the work order or availability work package. These audits shall be designed to validate that all work performed complies with the requirements of this manual.

5.5.3.5 AUDITS OF TYCOM MANAGED AVAILABILITIES WITHOUT FORMAL WORK PACKAGES.

Where audits of depot activity work performed on SUBSAFE components are not specifically required by the work order, the activity's functional audits, carried out in accordance with paragraph 5.5.3.1, shall be the basis for ensuring that the processes used in accomplishing the work comply with the requirements of this manual.

5.5.4 TYPE COMMANDER AUDITS.

The Type Commander is responsible for all SUBSAFE work performed by personnel under his control. This responsibility includes audits performed to validate the adequacy of controls and fabrication. These audits may include functional and special audits.

5.5.5 NAVSEA SUBSAFE CERTIFICATION AUDIT (SSCA) DOCUMENTATION REQUIREMENTS.

Prior to the NAVSEA SSCA of any submarine, the Supervising Authority shall provide required data and documentation as described in the following paragraphs.

5.5.5.1 SUBMARINE SAFETY INTERNAL AUDITS.

The Supervising Authority shall forward the Internal SSCA to the Program Manager's Office with a copy to NAVSEA 92Q. The copies shall be forwarded to arrive at NAVSEA no later than one week prior to scheduled start of the NAVSEA SSCA. Additional audit reports shall be provided to the NAVSEA audit team on their arrival. These reports will include pages updated as necessary to reflect the current status of the audit report.

5.5.5.2 SUBMARINE SAFETY CERTIFICATION AUDIT PLAN (SSCAP).

The Supervising Authority shall ensure that the SSCAP is prepared based on the requirements of this manual and submitted to NAVSEA not later than one month prior to the start of the NAVSEA SSCA. SSCAPs which deviate from the baseline audit plan will require an approval of the deviation by NAVSEA. The Supervising Authority shall use the approved SSCAP as the basis for conducting the Internal SSCA. The SSCAP shall be used to develop a matrix which identifies the names and phone numbers of the shipyard contact points for each area in the SSCAP. The SSCAP shall also identify the supporting documents for each line item of the SSCAP. All instructions (NAVSEA, shipyard, or other) that establish or implement certification requirements should be readily available for the team leader and team members to utilize.

5.5.5.3 STATUS OF NAVSEA SUBSAFE CERTIFICATION AUDIT (SSCA) CATEGORY IIA RECOMMENDATIONS.

At the start of the NAVSEA SSCA, the shipyard shall present documentation to the audit team leader detailing the shipyard's review of all outstanding NAVSEA SSCA Category IIA recommendations for impact on the ship being audited. For those recommendations which impact the ship being audited, the shipyard shall present OQE that appropriate and satisfactory corrective action has been taken.

5.5.5.4 OTHER DOCUMENTATION.

NAVSEA may request the shipyard to provide additional documentation that supports SUBSAFE certification attributes.

5.6 SEA TRIALS.

For New Construction, the NAVSEA message prior to Alpha Sea Trials certifies both the SUBSAFE and non-SUBSAFE material condition of the ship. All other certification messages address the SUBSAFE material condition only.

For Major Depot Availability, the Supervising Authority message prior to Fast Cruise certifies both the SUBSAFE and non-SUBSAFE material condition of the ship for those parts installed, repaired, and/or tested by the depot activity. All other certification messages address the SUBSAFE material condition only.

Non-SUBSAFE material condition specifics are coordinated between the Supervising Authority, NAVSEA 92, and the applicable Submarine Program Manager (PMS).

5.6.1 BUILDER'S TRIALS.

5.6.1.1 NAVSEA RESPONSIBILITIES.

In relation to the planning and performance of builder's sea trials for new construction submarines NAVSEA shall:

a. Conduct SSCAs and provide the Supervising Authority, the ship's Officer In Charge, and the Type and Fleet Commanders a copy of the SSCA Report.

b. Review and approve the Sea Trial Agenda, Deep Dive Test Form and Emergency Main Ballast Tank Blow Test Procedure forwarded by the Supervising Authority. The Sea Trial Agenda shall provide the detailed sequence of events for conducting the sea trials. The Deep Dive Test Form shall comply with NAVSEAINST C9094.2.

c. During the builder's sea trials, provide supervision of testing and technical guidance on matters such as the hull and submarine systems. Operational control during builder's sea trials is the responsibility of the TYCOM.

d. Following verification from the Supervising Authority that all SUBSAFE work necessary for Alpha Sea Trials has been completed, including resolution of all Category I audit recommendations, and report of readiness of the ship for commencement of Fast Cruise, certify to the TYCOM, with information copies to the Chief of Naval Operations and the appropriate Fleet Commander, the material condition of the ship is satisfactory for sea trials to a specified percent of test depth.

e. Following verification from the Supervising Authority of satisfactory completion of builder's Alpha Sea Trials and status of all incomplete NAVSEA SSCA Category IA recommendations, prior to Bravo Sea Trials, certify to the TYCOM, with information copies to the Chief of Naval Operations and the appropriate Fleet Commander, that the SUBSAFE material condition of the ship is satisfactory for sea trials to test depth. Repeat the routine for each subsequent sea trial.

f. Following verification from the Supervising Authority of satisfactory completion of all builder's sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, and resolution of all NAVSEA SSCA Category IA recommendations, certify to the Type Commander, with information copies to the Chief of Naval Operations and the appropriate Fleet Commander, that the SUBSAFE material condition of the ship is satisfactory and recommend unrestricted operations to test depth.

5.6.1.2 SUPERVISING AUTHORITY'S RESPONSIBILITIES.

In relation to the planning and performance of builder's sea trials for new construction submarines the Supervising Authority shall:

a. Provide sufficient time for crew training during the construction period to permit the Ship's Force to attain a state of training adequate to ensure proper operation and safety of the ship and its personnel during sea trials.

NOTE

The scheduling and sequencing of trials involving tests of a reactor plant propulsion plant must be approved by the Commander, Naval Sea Systems Command.

b. Ensure shipbuilder submits Sea Trial Agenda, Deep Dive Test Form, and Emergency Main Ballast Tank Blow Test Procedures for forwarding to and approval by NAVSEA at least six weeks prior to sea trial date; obtain concurrence from the TYCOM for operational aspects of the Sea Trial Agenda.

NOTE

The sea trial agenda shall identify and require NAVSEA authorization for any installation of test equipment, system, or component modification or installation of equipment for evaluation which could impact the normal operation of equipment or systems in carrying out the agenda. If there are no such installations, the agenda shall so state. The agenda shall also identify any operating instructions or special tests which have been invoked which could impact the normal operations of equipment or systems in carrying out the agenda.

c. Report the status of the SUBSAFE material condition of the ship prior to each sea trial.

(1) Report by message to NAVSEA, in advance of the scheduled start of Fast Cruise, that all SUBSAFE work necessary for Alpha Sea Trials, including resolution of NAVSEA SSCA Category I recommendations, has been completed,

provide the status of all incomplete NAVSEA SSCA Category IA recommendations, and that the ship is ready for commencement of Fast Cruise. The message shall also state that there are no conditional SUBSAFE Deviations or Waivers which have not been satisfied or cite those that exist, and that, subject to satisfactory completion of Fast Cruise and resolution of mandatory SUBSAFE deficiencies, the SUBSAFE material condition of the ship is satisfactory for commencement of sea trials. Make a similar report prior to each subsequent sea trial.

NOTE 1

Prior to SUBSAFE certification by NAVSEA, SUBSAFE work reported on in item c. above shall include that performed by Ship's Force.

NOTE 2

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Subsequent to the messages in item c.(1) above, any deficiency discovered and the corrective action taken which affects watertight integrity, the recoverability of the ship, the operation of the ship's control surfaces, or the ship's salvage capability shall be reported to NAVSEA and the appropriate Fleet and Type Commanders by message. Previous NAVSEA certification of material condition shall be suspended until NAVSEA reviews the report and certifies to the TYCOM by message that the material condition of the ship is satisfactory for sea trials to a specified depth.

(2) Report by message to NAVSEA and TYCOM, with the concurrence of the Officer In Charge, successful completion of Fast Cruise as a prerequisite for the start of sea trials.

(3) Report by message to NAVSEA the satisfactory completion of Alpha Sea Trials and report the status of all incomplete NAVSEA SSCA Category IA recommendations.

d. Report by message to NAVSEA the satisfactory completion of all builder's sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, and resolution of all NAVSEA SSCA Category IA recommendations. Report that the SUBSAFE material condition of the ship is satisfactory for unrestricted operations to test depth. Identify all deferred SUBSAFE work and/or conditionally approved deviations and waivers to date which have not had the condition satisfied.

5.6.1.3 TYCOM'S RESPONSIBILITIES.

In relation to the SUBSAFE aspects of the planning and performance of builder's sea trials for new construction submarines the TYCOM shall:

a. Conduct ship Salvage Inspection.

b. Concur in the operational aspects of the Sea Trial Agenda.

c. Ensure that NAVSEA is made an "INFO" addressee on messages reporting crew readiness for underway trials.

d. Prior to Alpha Sea Trials and following NAVSEA certification that the material condition of the submarine is satisfactory for sea trials to a

specified percent of test depth and Supervising Authority report that the SUBSAFE material condition is satisfactory for commencement of Alpha Sea Trials, report by message to ship authorizing conduct of sea trials and dives to a specified percent of test depth. Prior to Bravo and subsequent sea trials, following certification from NAVSEA and report from the Supervising Authority that the SUBSAFE material condition of the submarine is satisfactory for sea trials to test depth, report by message to ship authorizing conduct of sea trials and dives to test depth. State in each message that the depth authorization is suspended upon re-entry to the SUBSAFE certification boundary or casualty affecting recoverability, salvage, watertight integrity, or operation of ship's control surfaces. For such cases, ensure that the ship does not operate at a depth greater than 200 feet until re-entry is certified and TYCOM approval to operate to previously authorized depth is granted.

NOTE

Subsequent to the above TYCOM messages, Ship's Force SUBSAFE work shall be recertified per paragraph 6.3.2.3.5 except that sea trial depth restrictions continue to apply. Sea trial SITREPs shall be used to keep TYCOM, NAVSEA, and Supervising Authority informed of the repair status of Ship's Force SUBSAFE work.

e. After all builder's sea trials, and following NAVSEA certification that the SUBSAFE material condition of the submarine is satisfactory, report by message to ship authorizing unrestricted operations to test depth.

5.6.2 POST-MAJOR DEPOT AVAILABILITY TRIALS.

5.6.2.1 NAVSEA RESPONSIBILITIES.

In relation to the planning and performance of post-major depot availability sea trials for maintaining certification of previously certified submarines, NAVSEA shall:

a. Arrange for the technical assistance, when required, of the Department of Energy, including performance of a post-major depot availability reactor plant safeguards examination by the Director, Division of Naval Reactors.

b. Conduct SSCAs and provide to the Supervising Authority, the ship's Commanding Officer, and the Type and Fleet Commanders a copy of the SSCA Report.

c. Review and concur with the Sea Trial Agenda submitted by the Supervising Authority. Review and approve the Deep Dive Test Form and Emergency Main Ballast Tank Blow Test Procedures submitted by the Supervising Authority. The Sea Trial Agenda shall provide the detailed sequence of events for conducting the sea trials.

d. For each sea trial, following verification from the Supervising Authority that all work performed by the depot activity necessary for sea trials has been completed, including resolution of NAVSEA SSCA Category I recommendations and status of incomplete NAVSEA SSCA Category IA recommendations, and that the material condition of those parts of the ship installed, repaired, and/or tested by the depot activity is satisfactory, certify to the TYCOM, with information copies to the Chief of Naval Operations and the appropriate Fleet Commander, that the SUBSAFE material condition of

those parts of the ship installed, repaired and/or tested by the depot activity is satisfactory for sea trials and controlled dives to specified depths (usually test depth).

e. Following verification from the Supervising Authority of satisfactory completion of all sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, and resolution of all NAVSEA SSCA Category IA recommendations, certify to the TYCOM, with information copies to Chief of Naval Operations and the appropriate Fleet Commander, the SUBSAFE material condition of those parts of the ship installed, repaired, and/or tested by the depot activity is satisfactory, and recommend authorization for unrestricted operations to design test depth subject to TYCOM verification that SUBSAFE certification of areas outside depot work package has been sustained.

5.6.2.2 SUPERVISING AUTHORITY'S RESPONSIBILITIES.

In relation to post-major depot availability sea trials for submarines requiring maintenance of certification, the Supervising Authority shall:

a. Provide sufficient time for crew training during the major depot availability period to permit the Ship's Force to attain a state of training adequate to ensure proper operation and safety of the ship and its personnel during sea trials.

NOTE

The scheduling and sequencing of trials involving tests of a reactor plant propulsion plant must be approved by the Fleet Commander-in-Chief and concurred to by the Commander, Naval Sea Systems Command.

b. Submit the Sea Trial Agenda to TYCOM for approval prior to Fast Cruise. Also, prior to Fast Cruise, submit the Sea Trial Agenda to NAVSEA for concurrence and the Deep Dive Test Form and Emergency Main Ballast Tank Blow Test Procedures to NAVSEA for approval. The Sea Trial Agenda shall provide the detailed sequence of events for conducting the sea trials required to be performed.

c. Schedule ship salvage inspection to ensure sufficient time for the TYCOM to conduct the inspection and for correction of deficiencies.

d. Report the status of the material condition of those parts of the ship installed, repaired and/or tested by the depot activity prior to each sea trial.

(1) Report by message to NAVSEA and TYCOM, in advance of the scheduled start of Fast Cruise, that those parts of the ship installed, repaired and/or tested by the depot activity are certified satisfactory for post repair sea trials, including resolution of NAVSEA SSCA Category I recommendations and status of all incomplete NAVSEA SSCA Category IA recommendations, and report that the ship is ready for commencement of Fast Cruise. The message shall also state that there are no conditional SUBSAFE Deviations or Waivers which have not been satisfied or cite those that exist, and that, subject to satisfactory completion of Fast Cruise and resolution of mandatory deficiencies, the material condition of the ship is satisfactory for

commencement of sea trials. Make a similar report prior to each follow-on sea trial.

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NOTE

Subsequent to the messages in item d.(1) above, any deficiency discovered and the corrective action taken which affects the watertight integrity, the recoverability of the ship, the operation of the ship's control surfaces, or the ship's salvage capability shall be reported to NAVSEA and the appropriate Fleet and Type Commanders by message. Previous certification of material condition shall be suspended until NAVSEA and TYCOM review the report and NAVSEA certifies to the TYCOM by message that the material condition of the parts of the ship covered by the depot work package is satisfactory for sea trials to a specified depth, and the TYCOM in turn certifies to the ship that the ship's SUBSAFE Certification Boundary is satisfactory for sea trials to a specified depth.

(2) Report by message to NAVSEA and TYCOM, with the concurrence of the Commanding Officer, the successful completion of Fast Cruise and SUBSAFE material condition readiness as a prerequisite to start of sea trials.

(3) Where a previous sea trial was aborted, or corrective actions for sea trial deficiencies require an additional deep dive, report by message to NAVSEA that the SUBSAFE material condition of those parts of the ship installed, repaired, and/or tested by the depot activity is satisfactory for follow-on sea trials to test depth.

e. Report by message to NAVSEA, satisfactory completion of all sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, and resolution of all NAVSEA SSCA Category IA recommendations. Report that the SUBSAFE material condition of those parts of the ship installed, repaired, and/or tested by the depot activity is satisfactory for unrestricted operations to test depth. Identify all deferred SUBSAFE work and/or conditionally approved deviations and waivers to date which have not had the condition satisfied.

5.6.2.3 TYCOM'S RESPONSIBILITIES.

In relation to the planning and performance of post-major depot availability trials the TYCOM shall:

a. Conduct ship Salvage Inspection.

b. Approve Sea Trial Agenda.

c. Report, by message, crew readiness for underway trials.

d. Prior to each sea trial, following certification from the Supervising Authority and NAVSEA that the material condition of those parts of the ship installed, repaired and/or tested by the depot activity is satisfactory for sea trials and TYCOM verification that the SUBSAFE certification of those parts of the ship not affected by the depot work package has been sustained, report by message to the ship, with copies to Chief of Naval Operations and NAVSEA, reporting that the status of the SUBSAFE Certification Boundary is satisfactory and authorizing the conduct of sea trials and dives to specified

depth. State in the message that the depth authorization is suspended upon re-entry to the SUBSAFE certification boundary or casualty affecting recoverability, salvage, watertight integrity, or operation of ship's control surfaces. For such cases, ensure that the ship does not operate at a depth greater than 200 feet until re-entry is certified and TYCOM approval to operate to previously authorized depth is granted.

NOTE

Subsequent to the above TYCOM messages, Ship's Force SUBSAFE work shall be recertified per paragraph 6.3.2.3.5 except that sea trial depth restrictions continue to apply. Sea trial SITREPS shall be used to keep TYCOM, NAVSEA, and Supervising Authority informed of the repair status of Ship's Force SUBSAFE work.

e. Following verification from NAVSEA of satisfactory completion of all sea trials, completion of controlled dives, correction of all mandatory sea trial deficiencies, certification that the SUBSAFE material condition of those parts of the ship installed, repaired and/or tested by the depot activity is satisfactory, and upon confirmation of maintenance of SUBSAFE certification of portions of ship not affected by depot activity, report by message to ship, with copies to Chief of Naval Operations and NAVSEA, reporting status of SUBSAFE certification and authorizing unrestricted operations to test depth.

5.6.3 INSPECTION, TRIALS, AND REPORTING RESPONSIBILITIES FOR TYCOM MANAGED AVAILABILITIES.

5.6.3.1 SUPERVISING AUTHORITY RESPONSIBILITIES.

The Supervising Authority shall:

a. Submit the Sea Trial Agenda to the ship's Immediate Superior in Command (ISIC) for approval prior to Fast Cruise. The Sea Trial Agenda shall provide the detailed sequence of required events.

b. Schedule ship salvage inspection to ensure sufficient time for the ISIC to conduct the inspection and for correction of depot activity responsible deficiencies.

c. Report by message or letter, to the ship and ship's ISIC, copy to TYCOM, that all work by the depot activity was performed in accordance with the requirements of this manual.

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5.6.3.2 TYCOM RESPONSIBILITIES.

The TYCOM shall ensure that the ship’s ISIC:

a. Approves the Sea Trial Agenda.

b. Conducts a salvage inspection.

c. Following verification from the Supervising Authority that all SUBSAFE work by the depot activity was performed in accordance with the requirements of this manual, verifies that the SUBSAFE certification of those parts of the ship not affected by the availability work package has been sustained.

d. Upon completion of item c. above, reports by message to the ship, copy to CNO and NAVSEA, that the status of the SUBSAFE certification boundary is satisfactory, and that the ship is authorized to conduct sea trials and dives to a specified depth.

5.7 REPORTING REQUIREMENTS.

During the process of initial SUBSAFE certification of new construction submarines or continued maintenance of SUBSAFE certification for submarines completing major depot availabilities, numerous reports and messages pass between the Supervising Authority, NAVSEA, shipbuilder or other depot activity and the TYCOM. Note that letters may be used in lieu of messages.

Table 5-1 provides detailed countdown milestones for key events and actions that will lead to a submarine's initial certification or continued certification for unrestricted operations to test depth. This countdown sequence starts approximately 90 days prior to Fast Cruise and ends at delivery or completion of the major depot availability. The table identifies:

a. Milestones in their approximate chronological order,

b. The activity ultimately responsible for performing or coordinating the specific milestone and,

c. The applicability of the milestone to new construction and major depot availabilities.

See Appendix B for sample messages.

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
	90 Days Prior to Fast Cruise			
90-1	Distribute written notification in NAVSEA (SEA 92Q, SEA 03) that Fast Cruise is scheduled for a specific date	PMS	X	X
90-2	Design Yard (DY) issue updated version (if required) of SUBSAFE Baseline (Non-Nuclear SSN 688 Class and later SSNs) based upon the shipbuilder's/depot activity's published schedule	DA	X	X
90-3	Submit Class Design Review Update (if required)	DA	X	X
90-4	Recommend date for NAVSEA SUBSAFE Certification Audit (SSCA)	SA	X	X
90-5	Issue letter or speedletter accepting audit date	SEA 92Q	X	X
90-6	Identify serial numbers of installed GFM to NAVSEA PMS	SA	X	
90-7	Provide Design Yard/Planning Yard with marked up copy of SSCB Book	SA	X	X
90-8	Ensure Hull UT Survey data submitted by shipbuilder is satisfactory	SEA 03	X	
90-9	Provide list of SUBSAFE and Hull Integrity Castings to SEA 92Q for which RTs are not maintained on-site but are required to support this specific audit	SA	X	X
90-10	Provide funding for audit team	SEA 92Q	X	X
90-11	Identify audit team leader and establish audit team	SEA 92Q	X	X
90-12	Validate list of GFM	PMS	X	

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
60 Days Prior to Fast Cruise				
60-1	Distribute notification in NAVSEA that Fast Cruise is scheduled for a specific date	PMS	X	X
60-2	Ensure that the Sea Trial Agenda has been submitted to NAVSEA for approval (new construction) or concurrence (major depot availability)	SA	X	X
60-3	Ensure Deep Dive Test Form and EMBT Blow Procedure requiring NAVSEA review or approval have been submitted	SA	X	X
60-4	Supervising Authority (SA) prepare and submit SSCAP to NAVSEA Program Manager (PMS) for approval, with copy to SEA 92Q	SA		X
60-5	Start Internal SSCA	SA	X	X

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
45 Days Prior to Fast Cruise				
45-1	Write approval letters for Class Design Review Update (as applicable)	PMS	X	X
45-2	Submit Ship Design Review to NAVSEA PMS	SA	X	X
45-3	Provide SEA 92Q with a list of all SUBSAFE departures from design and contractual requirements submitted to NAVSEA PMS for action	PMS	X	X
45-4	Validate Fast Cruise dates and notify SEA 92Q of any anticipated changes	SA	X	X
45-5	Identify to NAVSEA PMS any shipbuilder Manual Change Requests for Ship System Manuals for which changes have not been issued by the Design Yard (SSN 688 Class specific)	SA	X	
45-6	Identify to NAVSEA PMS and SEA 92Q the turnover status of onboard logistic technical data involving SUBSAFE	SA	X	X
45-7	Acknowledge receipt of SA Internal SSCA Report	SEA 92Q	X	X
45-8	Approve SSCAP	SEA 92Q		X

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
30 Days Prior to Fast Cruise				
30-1	Confirm Fast Cruise date and notify SEA 92	PMS	X	X
30-2	Approve Deep Dive Test Form and EMBT Blow Procedure (if required)	PMS	X	X
30-3	Conduct ship salvage inspection	TYCOM	X	X
30-4	Approve (new construction) or concur with (major depot availability) Sea Trial Agenda	PMS/NAVSEA	X	X
30-5	Conduct NAVSEA SSCA	SEA 92Q	X	X
30-6	Conduct in-house debrief of NAVSEA SSCA Report	SEA 92Q	X	X
30-7	Issue formal NAVSEA SSCA Report	PMS	X	X
30-8	Submit Ship Design Review Update to NAVSEA PMS	SA	X	X
30-9	Approve Ship Design Review Reports	PMS	X	X
30-10	Review status of outstanding NAVSEA SSCA CAT I and CAT IA recommendations	PMS	X	X
30-11	Approve Design Review Update	PMS	X	X
30-12	Confirm serial numbers and certification status of installed GFM	PMS/SA	X	

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
	Fast Cruise			
FC-1	Pre-position draft Fast Cruise message identifying resolution of all NAVSEA SSCA CAT I and status of CAT IA recommendations - Target: 3 days prior to Fast Cruise	SA	X	X
FC-2	Brief SEA 92Q on certification status and obtain concurrence for initial sea trials - Target: 3 days prior to Fast Cruise	PMS	X	X
FC-3	Prepare initial sea trial message. Obtain concurrence from SEA 92Q and SEA 08 - Target: 2 days prior to Fast Cruise	PMS	X	X
FC-4	Release initial sea trial message - Target: 24 hours prior to Fast Cruise	SEA 92	X	X
FC-5	Receive SEA 92 message and send message to ship authorizing at sea operations	TYCOM	X	X
FC-6	Conduct Fast Cruise	SF	X	X
FC-7	Release message reporting satisfactory Fast Cruise	SA	X	X

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
	NEW CONSTRUCTION Initial Sea Trials			
T-0	Conduct initial sea trials	SF	X	X
T-1	Provide report to NAVSEA PMS on results of initial sea trials and provide status of NAVSEA SSCA CAT IA recommendations - Target: 48 hours prior to deep dive sea trials	SA	X	
T-2	Brief cognizant SEA 92 codes on certification status and obtain concurrence for deep dive sea trials	PMS	X	
T-3	Prepare deep dive sea trials message and obtain concurrence from SEA 92Q and SEA 08 - Target: 36 hours prior to deep dive sea trials	PMS	X	
T-4	Release deep dive sea trials message - Target: 24 hours prior to deep dive sea trials	SEA 92	X	
T-5	Review all outstanding SUBSAFE and Hull Integrity items. Identify which items must be cleared prior to recommendation for unrestricted operations and which will be accomplished at PSA; identify any SUBSAFE and Hull Integrity related work which was planned for and accepted by the shipbuilder but deferred for accomplishment at PSA - Target: 5 days after completion of INSURV Trials	PMS	X	
T-6	Prepare initial SUBSAFE certification and recommendation for unrestricted operations message and obtain concurrence from SEA 92Q and SEA 08	PMS	X	
T-7	Release initial SUBSAFE certification and recommendation for unrestricted operations message	SEA 92	X	

TABLE 5-1. DETAIL MILESTONES FOR COUNTDOWN OF SUBSAFE CERTIFICATION

MILESTONE	DESCRIPTION	RESPONSIBLE ACTIVITY	APPLICABILITY	
			NEW CONSTRUCTION	MAJOR DEPOT AVAILABILITY
MAJOR DEPOT AVAILABILITY				
T-0	Conduct major depot availability trials	SF		X
T-1	Report results of major depot availability trials to NAVSEA PMS	SA		X
T-2	Brief SEA 92Q on certification status of depot work	PMS		X
T-3	Prepare certification message for work accomplished by depot activity, and identifying any deferred SUBSAFE work; obtain concurrence from SEA 92Q and SEA 08	PMS		X
T-4	Release message certifying depot level work accomplished	SEA 92		X
T-5	Verify that SUBSAFE certification of areas outside of depot work package has been sustained	TYCOM		X
T-6	Release message to ship reporting status of total SUBSAFE certification and authorizing unrestricted operations to test depth	TYCOM		X

SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

CHAPTER 6

SUBSAFE CERTIFICATION MAINTENANCE

6.1 PURPOSE.

This chapter sets forth the policy for the maintenance of SUBSAFE certification. This chapter also provides the control procedures and delineates the responsibilities necessary to ensure that the submarine material condition is maintained in accordance with the requirements to support continuity of SUBSAFE certification during the ship's operational life. For SUBSAFE purposes, ship operational life ends when the ship starts an inactivation availability.

6.2 POLICY.

Subsequent to a system or equipment within the SUBSAFE Certification Boundary being validated by the shipbuilder, all work within the SUBSAFE Certification Boundary shall be accomplished, controlled, and documented in accordance with the requirements of this manual. All preventive maintenance, corrective maintenance, repairs, alterations, and/or modifications shall be accomplished, inspected, and tested to the guidelines of this manual. Periodic monitoring of certified material shall be accomplished to identify and correct deterioration or degradation because of misuse or environmental condition in order to permit the ship's unrestricted operation. Following the initial certification of new construction and the recommendation for unrestricted operations of a submarine by NAVSEA, the Submarine Type Commander is responsible for maintaining the material condition in accordance with the requirements of this manual for continued unrestricted operations. This includes work performed by Ship's Force, tenders, and repair facilities reporting to the Type Commander.

6.3 SUBSAFE PROGRAM CERTIFICATION, CONTROL, AND SUPPORT.

In addition to establishing and administering the SUBSAFE Program, NAVSEA also provides the controls that must be implemented to ensure that certification requirements are maintained to meet SUBSAFE requirements. While NAVSEA maintains administrative control of the entire SUBSAFE Program, various organizations are responsible for compliance with program requirements during the operational life of SUBSAFE certified submarines. The following paragraphs describe specific areas of control and support necessary to maintain SUBSAFE certification and shall apply to all work accomplished within the SUBSAFE Certification Boundary.

6.3.1 CHANGES WITHIN THE CERTIFICATION BOUNDARY.

After a submarine has been certified for unrestricted operations to design test depth, changes to the SUBSAFE Certification Boundary may occur by the accomplishment of Fleet initiated changes, field changes, SHIPALTs, ORDALTs, SPALTs, and other authorized alterations. These changes may be alterations or modifications to a system or equipment; removal or addition of a system; or installation of new equipment or the replacement of existing equipment, fittings, or components with a substitute of a different configuration. Whenever any change or modification is accomplished within the SUBSAFE Certification Boundary specified in the applicable technical requirements chapter, prior approval from NAVSEA, or its designated agent, is required. If

the change also falls within the SUBSAFE Design Review Boundary, a new design review is required.

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6.3.2 RE-ENTRY CONTROL.

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Once a submarine has been SUBSAFE certified for unrestricted operations to design test depth, re-entry control procedures shall be used to control work within the SUBSAFE Certification Boundary. Work is defined as an action that actually or potentially changes (including disassembly) the approved configuration of any part of the SUBSAFE Certification Boundary. Exceptions to this requirement are noted in paragraph 6.3.2.2.

Re-entry control is the procedure used to provide an identifiable, accountable, and auditable record of work performed within the SUBSAFE Certification Boundary. It provides positive assurance that all SUBSAFE systems and components are restored to a fully certified condition. Re-entry control procedures contained herein are invoked for any activity conducting work within the SUBSAFE Certification Boundary. Item e. of paragraph 6.3.2.2 identifies actions within the SUBSAFE Certification Boundary which, while not necessarily fitting the above definition of work, do require re-entry control except when executed under the specific conditions listed. Except for these actions, operating components or systems within the boundary in accordance with their intended function does not require re-entry control procedures. The objective of re-entry control procedures is to provide maximum confidence that any work accomplished within the SUBSAFE Certification Boundary is authorized and executed in accordance with specifications, directives, etc., and is supported by objective quality evidence. Such evidence will verify:

a. Work was authorized and planned for accomplishment in a deliberate manner.

b. Actual work was accomplished in accordance with specified instructions, and required documentation has been completed, reviewed, and is correct.

c. The documentation and certification for the work accomplished have been reviewed for accuracy and completeness by an independent party.

d. The testing documentation has been reviewed for accuracy and completeness.

e. All certifications related to the re-entry control process have been reviewed for correctness and verified to be complete before the re-entry is closed.

Those portions of the re-entry control form (REC), Figure 6-1, corresponding to actions identified as items a. through e. above are identified by the corresponding letters (A through E) in the left hand margin of the REC.

NOTE

Normally the scope of work defined on one REC is limited to one mapping drawing. However, for selected complex components (e.g., signal ejector, trash disposal unit, logistics escape trunk, and torpedo tubes), a REC may involve multiple mapping plans.

6.3.2.1 RE-ENTRY CONTROL IMPLEMENTATION RESPONSIBILITIES.

Submarine Type Commanders and all activities performing work within the SUBSAFE Certification Boundary are responsible for implementing and administering the re-entry control requirements set forth in this manual.

For submarines that have been SUBSAFE certified, the submarine Type Commanders are responsible for ensuring that a written agreement is invoked between the submarine and each activity that is performing work within the SUBSAFE Certification Boundary. These written agreements shall precisely delineate the SUBSAFE responsibility of each activity for all phases of work being performed and shall be agreed to by all parties involved prior to processing the RECs used to control the SUBSAFE work.

6.3.2.2 RE-ENTRY CONTROL EXCEPTIONS.

The following are exceptions to the re-entry control requirements of this manual:

a. NAVSEA 08 has cognizance of reactor plant SUBSAFE components. Re-entry control and SUBSAFE certification of reactor plant systems shall be in accordance with NAVSEA 0989-LP-037-2000 (C).

b. For naval shipyards and private shipyards that are normally engaged in submarine construction or repair work:

(1) Grinding on SUBSAFE portions of hull structure does not require re-entry control, provided grinding is accomplished in accordance with a controlled process that ensures the depth of grinding does not reduce the thickness of the hull structure to less than the design thickness.

(2) Items (1) through (5), (7) through (10), (20), (21), and (25) in paragraph 6.3.2.2e do not require re-entry control for operation of those components when controlled by formal procedure which returns the component to the as-certified condition.

c. For Intermediate Maintenance Activities, and for other submarine Type Commander subordinate commands, re-entry control shall be invoked for all grinding on SUBSAFE portions of hull structure.

d. Re-entry control is not required for welding non-SUBSAFE items or structures to SUBSAFE hull structure.

e. For Operating Forces, the following specific exemptions to re-entry control requirements are authorized where frequent entry into the SUBSAFE Certification Boundary for routine operations or maintenance actions is required. The operational control considered necessary to meet the intent of the re-entry control requirements is listed below. These controls must be in effect to make the exemption valid. Except as noted, retests are not required to restore system certification.

Action Exempt From Re-entry Control	Operational Control	Recertification Testing
(1) Operation of access hatches and water tight doors	Ship's operating instructions (Note 1)	None
(2) Operation of trash disposal unit	Ship's operating instructions (Note 1)	None
(3) Streaming and retrieving the floating wire antenna	Ship's operating instructions (Note 1)	None
(4) Normal operation of the signal ejector/launcher, and hand ram operations	Ship's operating instructions (Note 1)	None
(5) Operation of shore services trunk	Ship's operating instructions (Note 1)	None
(6) Entry into auxiliary tanks modified for storage (does not include changing tank from wet to dry or vice versa)	Ship's operating instructions (Note 1)	None
(7) Operation of dry sonar sphere access hatch	Ship's operating instructions (Note 1)	None
(8) Streaming and retrieving of towed array sonar systems	Ship's operating instructions (Note 1)	None
(9) Normal operation of torpedo tube system	Ship's operating instructions (Note 1)	None
(10) (DELETED)		
(11) Cleaning shaft seal ASW strainer/filter	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(12) Removal/Reinstallation of external salvage pipe cap	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(13) Removal/Reinstallation of MS plugs (9/16" and smaller) including test fittings for gauge test or hydrostatic test	Formal work procedure, controlled assembly (Notes 2 and 3)	Note 4
(14) Cleaning seawater injection strainers	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(15) Cleaning ASW system strainers	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(16) Cleaning evaporator supply seawater strainers	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(17) (DELETED)		None

Action Exempt from Re-entry Control	Operational Control	Recertification Testing
(18) (DELETED)		
(19) (DELETED)		
(20) Operation of ESM nitrogen purge lines	Operation by qualified IMA ESM Mast repair personnel	None
(21) Operation of Periscope gassing valve	Operation by qualified IMA Periscope repair personnel	None
(22) Cleaning of seawater cyclone separator	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(23) Main closure regreasing on MOD 25 MSW pumps, SSN 21 and SSN 774 Class seawater pumps	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(24) Removal/Reinstallation of ASDS nitrogen system caps	Formal work procedure, controlled assembly (Notes 2 and 3)	None
(25) Hook-up and disconnect of shore power, including removal/replacement of shore power covers	Ship's operating instructions (Note 1)	None
(26) Fresh Water Flushing of Towed Array Handling System Valve/Seal Assembly	Formal work procedure, controlled assembly (Notes 2 and 3)	None

NOTES

1. Ship's operating instructions are procedures approved and signed by the submarine's commanding officer, or for SSN 688 and later classes of submarines, procedures which ensure system restoration to the as-certified condition (e.g., SSM, SEPM, Technical Manuals).

2. Formal work procedure in accordance with CINCLANTFLT/ CINCPACFLTINST 4790.3, Joint Fleet Maintenance Manual (JFMM) (e.g., PMS card, technical manual pages, detailed maintenance outline, etc.) will be used to control and document all work performed as a re-entry control exception.

3. Controlled assembly is defined as the proper assembly of a component, documented on QA form 34 to be in accordance with required specifications, verified and witnessed by a second person who is a quality assurance inspector.

4. The recertification test is an operational test to system operating pressure.

5. The recertification test is a hydrostatic test to no less than 200 psig.

6.3.2.3 REC CLOSEOUT.

All re-entry control actions shall be completed prior to releasing a submarine for unrestricted operations. Additionally, all RECs shall be closed prior to Fast Cruise and each sea trial. As a general policy, RECs shall not be closed out until all actions necessary to recertify the breach of the SUBSAFE Certification Boundary, including testing, have been completed. An acceptable alternative, however, is to close out a REC by transferring remaining at sea testing actions to a separate auditable accountability system. In this case, when the activity reports that all RECs have been closed, they shall also report if any RECs were closed by transferring actions and the status of these transferred actions. All RECs closed in this manner shall be annotated by the activity with the reference documents that contain the transferred actions. All transferred actions must be completed prior to the ship being released for unrestricted operations.

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6.3.2.3.1 MINOR DEPOT AVAILABILITIES.

Prior to a submarine going to sea for sea trials following a minor depot availability, the responsible Supervising Authority of the activity performing work and the submarine's commanding officer shall review their respective RECs and shall provide positive assurance to the submarine's immediate superior in the chain of command (ISIC) that all re-entry control actions are complete except for those that require at sea testing to provide system recertification.

Except for the carefully controlled dive to test depth required to recertify SUBSAFE work, the submarine shall not be operated at depths greater than one-half test depth plus 50 feet, unless specifically authorized by the TYCOM, and shall not be released for unrestricted operations until all RECs are closed.

6.3.2.3.2 MAJOR DEPOT AVAILABILITIES.

Prior to a submarine going to sea for sea trials following a major depot availability, the responsible Supervising Authority of the activity performing work and the submarine's commanding officer shall review the RECs under their cognizance and provide positive assurance to NAVSEA and the TYCOM, respectively, that all re-entry control actions are complete except those which require at sea testing to provide system recertification.

Except for the carefully controlled dive to test depth required to recertify SUBSAFE work, the submarine shall not be operated at depths greater than one-half test depth plus 50 feet, unless specifically authorized by NAVSEA, and shall not be released for unrestricted operations until all RECs are closed.

6.3.2.3.3 NEW CONSTRUCTION AND DELIVERY.

Prior to a submarine going to sea for sea trials following construction, the responsible Supervising Authority of the shipbuilder shall review the shipbuilder's and Ship's Force RECs and provide positive assurance to NAVSEA that all re-entry control actions are complete except those which require at sea testing to provide system recertification.

Except for the carefully controlled dive to test depth required to recertify SUBSAFE work, the submarine shall not be operated at depths greater than one-half test depth plus 50 feet, unless specifically authorized by NAVSEA, and shall not be released for unrestricted operations until all RECs are closed.

6.3.2.3.4 FORCES AFLOAT MAINTENANCE PERIODS.

Prior to a submarine going to sea following a Forces Afloat Maintenance Period, the submarine's commanding officer and the involved intermediate maintenance activity shall review the RECs under their cognizance and provide positive assurance to the ISIC that all re-entry control actions are complete except those which require at sea testing to provide system recertification.

Except for the carefully controlled dive to test depth required to recertify SUBSAFE work, the submarine shall not be operated at depths greater than one-half test depth plus 50 feet, unless specifically authorized by the TYCOM, and shall not be released for unrestricted operations until all RECs are closed.

6.3.2.3.5 VOYAGE OR AT SEA REPAIRS.

When voyage or at sea repairs involve re-entry control work, the submarine shall not be operated at depths greater than that permitted by CINCLANTFLT/CINCPACFLTINST 4790.3 for the initial tightness dive until the submarine's commanding officer completes a review of all respective RECs to ensure they are complete. If the review indicates that at sea testing is required to provide system recertification, and except for the carefully controlled dive to test depth to accomplish this recertification, the submarine shall not be operated at depths greater than that permitted by CINCLANTFLT/CINCPACFLTINST 4790.3. When all RECs are closed, the ship shall be released for unrestricted operations.

6.3.2.4 RE-ENTRY CONTROL FORM (REC) AND INSTRUCTION MATRIX.

The standard Re-entry Control Form (REC), Figure 6-1, and Instruction Matrix, Table 6-1, shall be utilized by all activities when re-entry control is required. Locally prepared forms are authorized provided no changes are introduced in the REC block wording or numbering. All activities shall promulgate internal procedures which utilize Figure 6-1 and Table 6-1. The REC and instruction matrix, the detailed work procedures used to support each REC, and the re-entry control log comprise the re-entry control system. The re-entry control system is to be used in conjunction with existing work authorization procedures, e.g., work permits.

When completion of a REC documenting shipyard performed reactor plant SUBSAFE work is required by NAVSEA 0989-037-2000, Table 6-1 specifies which REC blocks should be completed by the shipyard. The remaining REC blocks (including form initiation, ship performed testing, and REC closeout) should be completed by the ship.

SUBSAFE RE-ENTRY CONTROL FORM

1. FOR USS	SS	2. REC NO.	REV.

3. J.O./JCN

4. ORIGINATOR	5. ORGANIZATION
6. SYSTEM RE-ENTERED	7. RE-ENTRY LOCATION

8. COMPONENT(s)

WORK DESCRIPTION INCLUDING BOUNDARIES

9. JID MAP/DWG WITH REV

10. WORK TO BE PERFORMED AND WORK REFERENCE DOCUMENTS.

11. APPLICABLE JOINT NO(s), OR IF NOT SUPPLIED, SPECIFIC BOUNDARIES.

VERIFICATION AND CERTIFICATION

12. SUPPORTING DOCUMENTATION

APPROVAL FOR CONTROLLED RE-ENTRY

(A)

13. PRIME APPROVAL SIGNATURE	LEGIBLY PRINTED, TYPED, OR STAMPED NAME	DATE

VERIFICATION OF WORK COMPLETION

THE PRODUCTION WORK DESCRIBED BY THIS REC HAS BEEN ACCOMPLISHED IN ACCORDANCE WITH THE SPECIFIED INSTRUCTIONS AND THE REQUIRED DOCUMENTATION LISTED IN BLOCK 12 HAS BEEN COMPLETED, REVIEWED AND IS CORRECT.

(B)

14. APPROVAL SIGNATURE	LEGIBLY PRINTED, TYPED, OR STAMPED NAME	DATE

CERTIFICATION OF DOCUMENTATION OF PRODUCTION WORK

ALL DOCUMENTATION AND CERTIFICATION FOR PRODUCTION WORK SPECIFIED IN BLOCK 12 HAVE BEEN COMPLETED. THE DOCUMENTATION HAS BEEN REVIEWED FOR ACCURACY AND COMPLETENESS.

(C)

15. APPROVAL SIGNATURE	LEGIBLY PRINTED, TYPED, OR STAMPED NAME	DATE

CERTIFICATION OF TESTING RESULTS

THE TESTING INVOKED FOR THIS REC HAS BEEN COMPLETED. THE TEST DOCUMENTATION SPECIFIED IN BLOCK 12 HAS BEEN REVIEWED FOR ACCURACY AND COMPLETENESS BY THE COGNIZANT TECHNICAL AUTHORITY.

(D)

16. APPROVAL SIGNATURE	LEGIBLY PRINTED, TYPED, OR STAMPED NAME	DATE

FINAL REC CLOSEOUT CERTIFICATION

ALL CERTIFICATIONS RELATED TO THIS REC HAVE BEEN REVIEWED FOR CORRECTNESS AND VERIFIED TO BE COMPLETE. I CERTIFY THIS RE-ENTRY IS CLOSED.

(E)

17. PRIME APPROVAL SIGNATURE	LEGIBLY PRINTED, TYPED, OR STAMPED NAME	DATE

18. SHIP'S COMMANDING OFFICER SIGNATURE	LEGIBLY PRINTED, TYPED, OR STAMPED NAME	DATE

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
1	Enter Ship's name and hull number.	Enter Ship's name and hull number.	Enter Ship's name and hull number.	Enter Ship's name and hull number.
2	Obtain the next serial number in sequence from the ship's Quality Assurance Officer (QAO) and enter in space. Revision "-" shall be entered on the initial version of all RECs. When a revision is required, prepare a new REC utilizing the original numbers plus the next revision letter.	Obtain the next serial number in sequence from the ship's Quality Assurance Officer (QAO) (or IMA QAO for IMA only RECs) and enter in space. Revision "-" shall be entered on the initial version of all RECs. When a revision is required, prepare a new REC utilizing the original numbers plus the next revision letter.	Enter the next serial number in sequence in the re-entry control log. Initial version of the REC shall be Revision "-". When a revision is required, prepare a new REC utilizing the original number plus the next revision letter. The re-entry control log shall be one sequential list for each ship and availability.	Enter the next serial number in sequence in the re-entry control log. When a revision is required, prepare a new REC utilizing the original number plus the next revision letter. The re-entry control log shall be one sequential list for each ship and availability.
3	Enter the task number for the maintenance action.	Enter the task number for the maintenance action.	Enter the task number for the work item.	Enter the appropriate work identifier or control number.
4	Enter the name of the person requesting the REC.	Enter the name of the person requesting the REC.	Enter the name of the person requesting the REC.	Enter the name of the person requesting the REC.
5	Enter the division of the person requesting the REC.	Enter the division of the person requesting the REC.	Enter the shop of the person requesting the REC.	Enter the organization identification of the person requesting the REC.

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
6	Identify the system(s) being re-entered.	Identify the system(s) being re-entered.	Identify the system(s) being re-entered.	Identify the system(s) being re-entered.
7	Identify the physical location, i.e., ship or shop.	Identify the physical location, i.e., ship or shop.	Identify the physical location, i.e., ship or shop.	Identify the physical location, i.e., ship or shop.
8	Identify the noun names of the component(s) being re-entered.	Identify the noun names of the component(s) being re-entered.	Identify the noun names of the component(s) being re-entered.	Identify the noun names of the component(s) being re-entered.
9	Enter the number of the revision of the applicable mapping plan (or system diagram if not mapped) which depicts the disturbances (ship board). For component repairs, enter the applicable document (Standard Navy Valves Dwg., vender dwg., etc.) which depicts the disturbances of the item (work-in-place or shop work). Based on the scope of work planned, several drawings may need to be referenced. If	Enter the number of the revision of the applicable mapping plan (or system diagram if not mapped) which depicts the disturbances (ship board). For component repairs, enter the applicable document (Standard Navy Valves Dwg., vender dwg., etc.) which depicts the disturbances of the item (work-in-place or shop work). Based on the scope of work planned, several drawings may need to be referenced. If necessary, local sketches are authorized to depict	Enter the number of the revision of the applicable mapping plan (or system diagram if not mapped) which depicts the disturbances (ship board). For component repairs, enter the applicable document (Standard Navy Valves Dwg., vender dwg., etc.) which depicts the disturbances of the item (work-in-place or shop work). Based on the scope of work planned, several drawings may need to be referenced. If necessary, local sketches are authorized	Enter the number of the revision of the applicable mapping plan (or system diagram if not mapped) which depicts the disturbances (ship board). For component repairs, enter the applicable document (Standard Navy Valves Dwg., vender dwg., etc.) which depicts the disturbances of the item (work-in-place or shop work). Based on the scope of work planned, several drawings may need to be referenced. If necessary, local sketches are authorized

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
9 (Cont'd)	necessary, local sketches are authorized to depict disturbances and describe joints to be broken.	disturbances and describe joints to be broken.	to depict disturbances and describe joints to be broken.	to depict disturbances and describe joints to be broken.
10	The division concerned shall identify the total scope of work and testing required for certification of this re-entry. Enter the work description and make positive reference to the Controlled Work Package which contains the detailed work procedure, material requirements, testing, and certification to be performed.	The division concerned shall identify the total scope of work and testing required for certification of this re-entry. Enter the work description and make positive reference to the Controlled Work Package which contains the detailed work procedure, material requirements, testing, and certification to be performed.	Enter the total scope of work involved and list the work reference documents which contain the detailed work requirements.	Identify the total scope of work involved. List the reference document(s) which provide or reference work instructions.
11	Identify the joint numbers to be entered. If joint numbers are not supplied, the disturbances shall be described using piece numbers or item description directly relating to the referenced documents.	Identify the joint numbers to be entered. If joint numbers are not supplied, the disturbances shall be described using piece numbers or item description directly relating to the referenced documents.	Identify the joint numbers to be entered. If joint numbers are not supplied, the disturbances shall be described using piece numbers or item description directly relating to the referenced documents.	Identify the joint numbers to be entered. If joint numbers are not supplied, the disturbances shall be described using piece numbers or item description directly relating to the referenced documents.

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
12	The Division Officer concerned shall identify all supporting documentation and data required (QA Form 17, QA Form 17A, QA Form 34(3), NDT records, etc.) as established by the Controlled Work Package. (See Note 1)	The Lead Work Center's Division Officer shall identify all supporting documentation and data required (QA Form 17, QA Form 17A, QA Form 34(3), NDT records, etc.) as established by the Controlled Work Package. (See Note 1)	Identify all supporting documentation and data required for re-entry certification as established and certified by the cognizant technical authority, i.e., Design Division or Combat Systems Office. For reactor plant SUBSAFE work, Code 1390 Nuclear Inspection Division only identify Technical Work Document in accordance with NAVSEA 0989-LP-062-4000 and test document (if testing performed by shipyard). (See Note 1)	Identify all supporting documentation and data required for re-entry certification as established and certified by the cognizant technical authority. (See Note 1)
13	The Engineer shall sign and date, and legibly print, type or stamp his name, granting permission for work to commence. No re-entry work can start prior to this signature. This signature establishes the re-entry start date	The Repair Officer shall sign and date, and legibly print, type or stamp his name, granting permission for work to commence. No re-entry work can start prior to this signature. This signature establishes the re-entry start date and	Shipyard representative shall sign and date, and legibly print, type or stamp his/her name, verifying that the information in Blocks 1-12 accurately identifies the work to be performed and the boundaries to be re-entered. No re-entry	A designated member from the organization responsible for controlling REC shall sign and date, and legibly print, type or stamp his/her name after reviewing Blocks 1-12 for accuracy and completeness. (See Note 2.)

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
13 (Cont'd)	and signifies that formal certification of system/component must occur. See Note 2.	signifies that formal certification of system/component must occur. See Note 2.	work can start prior to the signature. See Note 2.	
14	The Division Officer concerned shall sign and date, and legibly print, type or stamp his name, verifying the production work described by the REC has been accomplished in accordance with the specified instructions and that the required documentation as listed in Block 12 has been completed, reviewed and is correct.	The Lead Work Center's Division Officer shall sign and date, and legibly print, type or stamp his/her name, verifying the production work described by the REC has been accomplished in accordance with the specified instructions and that the required documentation as listed in Block 12 has been completed, reviewed and is correct.	Production shop supervisor responsible for work accomplishment shall sign and date, and legibly print, type or stamp his/her name, after verification of production work and documentation completion. For reactor plant SUBSAFE work, insert "Not Applicable."	The supervisor responsible for work accomplishment shall sign and date, and legibly print, type or stamp his/her name after verification of production work and documentation completion.
15	The Ship's Quality Assurance Officer concerned shall sign and date, and legibly print, type or stamp his name, signifying that all documentation and certification for production work specified in Block 12	The IMA Quality Assurance Officer shall sign and date, and legibly print, type or stamp his name, signifying that all documentation and certification for production work specified in Block 12	Code 130 or designated representative shall sign and date, and legibly print, type or stamp his name after all documentation has been reviewed for accuracy and completeness. For reactor plant SUBSAFE	The appropriate representative shall sign and date, and legibly print, type or stamp his/her name after reviewing the REC form and supporting re-entry certification documentation for accuracy and

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
15 (Cont'd)	have been completed and the documentation has been reviewed for accuracy and completeness.	have been completed and the documentation has been reviewed for accuracy and completeness.	work, Code 1390 Nuclear Inspection Division only certify work complete in accordance with NAVSEA 0989-062-4000.	completeness.
16	The Ship's Quality Officer shall sign and date, and legibly print, type or stamp his name, signifying that the testing invoked for this REC has been completed and the test documentation specified in Block 12 has been reviewed for accuracy and completeness by the cognizant technical authority. (See Note 1)	The IMA Quality Officer shall sign and date, and legibly print, type or stamp his/her name, signifying that the testing invoked for this REC has been completed and the test documentation specified in Block 12 has been reviewed for accuracy and completeness by the cognizant technical authority. (See Note 1)	A shipyard representative shall sign and date, and legibly print, type or stamp his/her name after completion of testing and test results have been approved by the cognizant technical authority. For reactor plant SUBSAFE work, if shipyard performs testing, follow the above instructions. (See Note 1)	The cognizant technical authority responsible for reviewing REC for proper testing requirements shall sign and date, and legibly print, type or stamp his/her name after ensuring that testing is adequate for certification and has been completed. (See Note 1)

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
17	The Engineer shall sign and date, and legibly print, type or stamp his name, verifying that all certifications related to this REC have been reviewed for correctness and are complete. For reactor plant SUBSAFE work performed by a shipyard in an availability where NAVSEA does not certify SUBSAFE work, the Engineer shall sign and date, and legibly print, type or stamp his name, verifying that all certifications related to the work and testing performed are complete based on the certifications provided in blocks 15 and 16; no detailed review of shipyard work documentation is required. (See Note 1)	The Repair Officer shall sign and date, and legibly print, type or stamp his/her name verifying that all certifications related to this REC have been reviewed for correctness and verified complete. (See Note 1)	Code 130 or designated representative, who is completely accountable and responsible, shall sign and date, and legibly print, type or stamp his/her name after reviewing the completed documentation package. This individual shall not have signed Block 15. (See Note 1)	A designated member from the organization responsible for controlling the REC shall sign and date, and legibly print, type or stamp his/her name after reviewing the REC form and supporting re-entry certification document. (See Note 1)

TABLE 6-1. SUBSAFE RE-ENTRY CONTROL FORM (REC) INSTRUCTION MATRIX (CONT'D)

BLOCK NUMBER	SHIP'S FORCE	SHIP'S FORCE & IMA AND IMA ONLY	PUBLIC SHIPYARD	PRIVATE SHIPYARD
18	The Ship's Commanding Officer shall sign and date, and legibly print, type or stamp his name, acknowledging that the REC has been closed by the Engineer. For reactor plant SUBSAFE work performed by a shipyard in an availability where NAVSEA does not certify SUBSAFE work, the Ship's Commanding Officer shall sign and date, and legibly print, type or stamp his name, verifying that the REC has been closed by the Engineer as indicated by the signature in block 17.	For Ship's Force & IMA RECs, the Ship's Commanding Officer shall sign and date, and legibly print, type or stamp his name, acknowledging that the REC has been closed by the Repair Officer. For "IMA only" RECs, this block is left blank.	This block is left blank.	This block is left blank.

NOTE 1: When an activity closes out a REC by transferring the remaining open actions to a separate auditable accountability system, Block 12 shall be revised to identify the reference documents that contain the transferred actions. The Block 16 signature then signifies that the reference documents have been reviewed, contain the transferred actions, and that the actions required by the reference documents will fulfill the recertification requirements. The Block 17 signature verifies that the documentation package for closing the REC has been reviewed and is complete.

NOTE 2: Where authorized by local procedures, the sequencing of blocks 12 and 13 is optional.

6.3.2.4.1 REC REVISIONS.

A REC shall be revised whenever one or more of the following occurs:

a. There is a change in the scope of work to be performed within the previously established work boundaries (Figure 6-1, Block 10).

b. There is a change in the work boundaries previously associated with the REC (Figure 6-1, Block 11).

c. There is a change in the previously issued testing requirements and/or recertification requirements (Figure 6-1, Blocks 10 and 12).

A REC revision is not required to make administrative corrections to a REC.

6.3.2.5 RE-ENTRY CONTROL LOG.

Type Commanders and activities accomplishing SUBSAFE work shall establish and administer procedures for re-entry control logs. Re-entry control logs at each activity shall contain the following minimum information:

a. Unique sequential REC numbers, including revisions.

b. Submarine hull or Navy maintenance activity number (e.g., SSBN 657, AS 41).

c. System re-entered.

d. REC final close-out date.

e. Remarks, a summary of the work description of the re-entry, and any other pertinent information (e.g., repair ASW-617, accomplish URO/MRC-008 on ASW-203, overhaul #2 periscope, etc.).

f. Re-entry control log consecutive page number.

6.3.2.6 RE-ENTRY CONTROL RECORD RETENTION REQUIREMENTS.

Type Commanders and activities accomplishing SUBSAFE work are responsible for establishing and administering procedures for retention of re-entry control records. These procedures shall provide for the following minimum requirements:

a. The re-entry control log, completed RECs, and supporting documentation shall be maintained for the operational life of the ship.

b. Approval to destroy non-ship-specific completed RECs, re-entry control logs, completed RECs, and supporting documentation must be obtained from NAVSEA 92Q.

c. The re-entry control records specified by item a. of this paragraph shall be available in an auditable condition for the period between ship major depot availabilities. Submarines shall maintain the original REC log and copies of the last 12 months of ship initiated RECs on board. A copy of the REC log and the original ship initiated RECs shall be maintained as required by the TYCOM.

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6.3.3 WORK PROCEDURES.

A REC should identify all requirements for work accomplishment and define the objective quality evidence required to support breaching and recertification of the SUBSAFE Certification Boundary. There will be cases where the REC, Figure 6-1, does not have sufficient space to provide the detailed information required. When this occurs, supplemental documents (e.g., detailed work procedures, Technical Repair Standards, and Design Liaison Memos) shall be used to meet the requirements of Blocks 10, 11, and 12 of the REC. These supplemental documents shall become part of the re-entry control system and shall be carefully cross-referenced, indexed, controlled, and packaged with the REC.

Work procedures and other supplemental documents shall provide specific control points within the process where independent inspections must be accomplished; e.g., weld joint fit-up and tolerances, correct valve internal installation prior to valve assembly, verification of O-ring and packing installation, etc. Either the REC or its associated supplemental documents shall identify the instruction, or specific parts thereof, that provides specific guidance to the worker for each step of work to be accomplished. The work procedure process shall include a revision process to change the work procedures and control the requirements when the scope of work is changed, e.g., weld repair of a valve body where the initial scope of the work required only replacement of the seats but subsequent inspection showed weld repair of the body was also required. These types of changes to work procedure also require the REC to be revised. To support the documentation required by Block 12 of the REC, Figure 6-1, written work procedures shall be used to accomplish the following:

a. Invoke the technical requirements and define the specific parts of the reference documents required to accomplish the specified work.

b. Define and invoke inspection criteria:

(1) Identify specific inspection data required.

(2)Specify shop or inspection branch that will accomplish required inspections.

(3) Specify in-process steps in the procedure where these inspections shall be accomplished.

c. Identify specific testing and test record requirements.

d. Identify the documentation necessary to prove the material integrity of the ship will be maintained.

6.4 UNRESTRICTED OPERATIONS MAINTENANCE REQUIREMENT CARDS (URO/MRCs).

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URO/MRCs have been developed to monitor specific areas of interest to determine if the conditions of these areas are suitable for continued unrestricted operations.

Periodic monitoring of material condition is required to ascertain that degradation through use, age, and environment does not cause these materials to fall outside of the maintenance and certification requirements. Monitoring consists of the preventive maintenance test and inspection procedures required to ensure early identification of any degradation of the SUBSAFE systems affecting flooding or ship recoverability.

A submarine shall be prohibited from submerging if URO/MRC requirements are not complied with, unless a NAVSEA waiver or TYCOM departure from specification is approved. All URO/MRC related waivers and deviations shall be categorized as MAJOR and processed in accordance with instructions in the applicable URO/MRC. With the exception of at-sea portions of URO/MRC-022, the Type Commander shall obtain NAVSEA technical approval of all URO/MRC related departures by Forces Afloat.

6.4.1 MONITORING PROCEDURES.

The monitoring procedures are written in Maintenance Requirement Card (MRC) format. Cards are collated into publications, with assigned NAVSEA numbers, for each submarine class.

The applicability of URO/MRCs in the class book to an individual submarine can be determined using the MRC Applicability Matrix located in the front of the class book. Applicability and specific URO/MRC Mod numbers are tabulated by hull numbers in the matrix. A list of Current Pages, published each quarter and located in front of the URO/MRC book, identifies the latest issue of each page.

The URO/MRCs provide specific requirements as to when, where, and how the test or inspection shall be conducted; the extent of test or inspection; the procedures to measure the material condition; the criteria for acceptance; the required monitoring intervals; and the requirements for recording and reporting data. The requirements specified in each URO/MRC shall not be changed unless specifically approved by NAVSEA. The class MRC documentation shall reflect the specific list of requirements and periodicities applicable to all ships of that class.

Table 6-2 provides a list of URO/MRC numbers and their corresponding titles.

6.4.2 MONITORING REQUIREMENTS.

Monitoring requirements necessitate satisfactory and timely accomplishment of the following:

a. Accomplishment of the URO/MRCs in accordance with the assigned periodicity approved by NAVSEA.

b. Immediate resolution of any unacceptable conditions found as a result of conducting the URO/MRC procedures.

c. Submission of reports required by individual URO/MRCs to the required distribution, as specified by the URO/MRC, after completion of the inspection or test.

d. Performance of applicable portions of operational URO/MRCs that are within periodicity following work, in accordance with paragraphs 4.4.2.3.3, 4.5.1.4.2, and 4.5.2.3.1.3, and section 4.6.8.4. Operational URO/MRCs are defined as URO/MRC 016, 019, 022, 025, 026, and 029.

e. Periodic audits to ensure required URO/MRC procedures are accomplished in a timely manner and appropriate corrective actions are executed.

6.4.3 NAVSEA RESPONSIBILITIES.

NAVSEA is responsible for providing the Type Commanders with the necessary guidance to monitor the material condition of submarines and to ascertain that the guidance is current and is based on the minimum acceptable conditions. The URO/MRCs pertaining to monitoring material condition fulfill part of this responsibility.

6.4.3.1 SUBMARINE PROGRAM MANAGER RESPONSIBILITIES.

a. For all new construction submarines, the designated NAVSEA Submarine Program Manager shall develop URO/MRC monitoring requirements for maintaining SUBSAFE certification and ensure that they are issued prior to the delivery of the first ship of the class.

b. For all commissioned submarines, the NAVSEA Submarine Program Manager is responsible to:

(1) Develop monitoring requirements for maintaining SUBSAFE certification and other material certification of all submarines and ensure that those requirements are issued in MRC format.

(2) Coordinate the efforts of the various NAVSEA codes to provide uniformity of guidance issued to the Type Commanders.

(3) Maintain MRC procedures current by conducting an annual review of the maintenance requirements with the objective of revising or eliminating the requirement or changing the frequency of accomplishment. In addition, maintain the MRC procedures from feedback data resulting from their use.

(4) Evaluate all proposed changes to the MRCs. MRCs shall not be changed unless specifically approved by NAVSEA.

(5) Ensure that NAVSEA cognizant maintenance and test programs alert users to documents that could invalidate operational URO/MRCs which are within periodicity.

(6) Ensure that Type Commanders are apprised of all developments pertinent to maintaining SUBSAFE certification.

6.4.4 TYPE COMMANDER RESPONSIBILITIES.

The Type Commander is responsible to implement the URO/MRC program, ensure compliance with assigned periodicities, and audit activities under his jurisdiction for compliance.

6.4.5 ACCOMPLISHING ACTIVITY'S RESPONSIBILITES.

a. When assigned, accomplish URO/MRCs in accordance with the NAVSEA approved procedures.

b. Immediately report to NAVSEA and Type Commander any unacceptable URO/MRC parameters which cannot be restored to specification and would require a departure.

c. Submit reports required by individual URO/MRCs to distribution specified and within the time requirements specified by the URO/MRC after completion of the inspection or test.

d. Ensure that applicable portions of in-periodicity operational URO/MRCs are performed following work which affects a measured parameter in accordance with paragraphs 4.4.2.3.3, 4.5.1.4.2, and 4.5.2.3.1.3, and section 4.6.8.4. This action shall be integral to the repair activity's acceptance test program for SUBSAFE work and administered in accordance with the REC closeout procedures of paragraph 6.3.2.3.

TABLE 6-2. URO/MRC TITLES

MRC No.	Title
001	Perform NDT Surveillance Inspection of Selected Hull Welds
002	Inspect Forward Shaft Tube and Hull Insert
003	Conduct Hull Structural Survey
004	Perform Ultrasonic Statistical Sampling Inspection of Hull Welds
005	Perform Ultrasonic Monitoring Inspection of Hull Welds with Known Discontinuities
006	Inspect Sea Water Pump Casing Wall Thickness
007	Inspect Main Condenser Inlet-Outlet Waterbox Weldments (NR-1 Only)
008	Inspect All Hull Valves 1 In. IPS and Larger, All Backup Valves 4 In. IPS and Larger, (Group 1), and 25 Percent of Backup Valves 1 to 3-½ In. IPS (Group 2)
009	Inspect Ball Valve Stems
010	Inspect Aluminum-Bronze/Nickel-Aluminum-Bronze Castings
011	Inspect RISIC 1 Flexible Couplings 4 In. IPS and Larger in Sea Water Systems Normally Exposed to Submergence Pressure Below 200 ft. (DELETED)
012	Inspect Flexible Hoses ½ In. (Dash Size 8) and Larger Installed in Sea Water Normally Subject to Submergence Pressure (DELETED)
013	Inspect Sea Water Piping Systems
014	Inspect ASW Pipe and Valves In Way of CO_2 Discharge (DELETED)
015	Inspect Steering and Stern Diving Gear
016	Inspect Stern Diving Gear Control Internal Linkage and Conduct Dockside Operational Test of Stern Diving Plane System (SSN 688 and SSBN 726 Classes Only)
017	Inspect Electrical Circuitry in Bow and Stern Planes Diving Control Systems (DELETED)
018	Inspect Flexible Hoses (All Sizes) Installed in the Stern Diving Hydraulic System (DELETED)
019	Conduct Dockside Operational Test of Stern Diving Plane System (Not Applicable to SSN 688 and SSBN 726 Classes)
020	Inspect Stern Diving Hydraulic System Components with Aluminum Alloy Bodies (Series 2014/2017 Al) (DELETED)
021	Inspect Stern Diving Hydraulic System Components with Aluminum Alloy Bodies (Series 2024 Al)
022	Check Operation and Tightness of EMBT Blow System Valves and Piping and Conduct Controlled Pitch-Angle Test
023	Inspect EMBT Blow CRES Piping for Corrosion and Pitting
024	Inspect EMBT Blow CRES Piping for Corrosion and Pitting (SSN 575 Only) (DELETED)
025	Conduct Operational Tests of the Emergency Flood Closure Hydraulic System
026	Check Each Flood Control Accumulator, Associated Air Flask, and Isolation Check Valves for Tightness
027	Inspect Flooding Control Hydraulic System Components with 2000 Series Aluminum Alloy Bodies (DELETED)

TABLE 6-2 (CONT'D) URO/MRC TITLES

MRC No.	Title
028	Inspect Shaft Seal Housing
029	Confirm Adequacy of Access to Vital Equipment
030	Inspect Diesel Exhaust System (AGSS 555 Only)
031	Inspect Recovery Subsystem (NR-1 Only)
032	Test for Proper System Operation (Lead Ballast) (NR-1 and AGSS 555 Only)
033	Inspect MBT Blow, Variable Ballast, Auxiliary Variable Ballast, Deep Depth Pressure Gage System, and Outboard Pipe Subject to Submergence Pressure (NR-1 Only)
034	Inspect Air Induction and Diesel Exhaust Outboard Piping Between Pressure Hull and Outboard Valve(s) of Hull Integrity Boundary (DELETED)
035	Conduct Structural Survey of Torpedo Tubes, Torpedo Ejection Cylinders, Trash Ejector Barrels, and Signal Ejector/Launcher Tubes
036	Verify that Submerged Operating Envelope Documentation is Current
037	Inspect Globe Stop, Globe Stop Check and Ball Valves for Corrosion
038	Inspect All 1-1/2 in. and 16/14 in. Hull and Backup Valves
039	Inspect Reducing Flanges for Crevice and Galvanic Corrosion
040	Inspect Engine Room Freshwater/Seawater Heat Exchangers No.1 and No.2 Seawater Side Handhole for Crevice Corrosion
041	Inspect Main Condenser Sea Water Side Inspection Ports for Crevice Corrosion
042	Inspect Sea Water Instrumentation Piping
043	Inspect Injector Body for Crevice Corrosion
044	Inspect DSRV Pylon and Drag Strut Mounting Plates Studss and Shear Keys, Penetrators, and Hold-Down Fitting
045	Inspect Thin-Line and Fat-Line Towed Array external hydraulic oil piping

6.5 MATERIAL TRANSFER.

6.5.1 MATERIAL CERTIFICATION MAINTAINED.

SSG 82

Material removed from an operating ship to be installed in a SUBSAFE application on another ship is acceptable under the following conditions:

a. A REC is used to document removal from the supplying ship. The supplying ship must be SUBSAFE certified, and re-entry control must still be in effect.

b. All outstanding Technical Variance Documentation designated departures, or other applicable technical variance documentation, the last accomplishment date and category of all applicable URO/MRC inspections, and all legible component markings shall be documented and supplied to the receiving activity along with a copy of the supplying ship's REC. This documentation shall be maintained and filed with the REC package that installed the equipment on the receiving ship. For pre-SSN 688 Class ships, technical variance documentation should be interpreted as any supplemental drawings or data which describe nonstandard configurations or modifications.

c. Receiving activity shall conduct material receipt inspection to verify the following conditions:

(1) Received component came from a ship that has been previously SUBSAFE certified and for which re-entry control has been maintained since initial certification.

(2) Material marking on hardware matches material marking on supporting software.

(3) Applicable URO/MRC inspections or any other maintenance actions are current for the intended end use.

(4) End use installation is consistent with the previous service parameters such as the design pressure rating, design temperature rating, or system applicability of the component.

d. Receiving activity shall update applicable software to document information and records provided by item b. of this paragraph, e.g., ship's drawing index for drawing revision, date of last URO/MRC periodicity accomplishment, and documentation of outstanding departures into installing ship's CSMP.

Material which does not satisfy all requirements of item c. of this paragraph shall be acceptable for use under the following conditions:

e. For material which does not meet the requirements of item c.(3) of this paragraph, the receiving activity must complete any URO/MRC inspections or any other maintenance due or overdue for the material. Any inspection not performed or other maintenance action not completed must be departed using the TYCOM departure from specification system.

f. For material which does not meet the requirements of item c.(4) of this paragraph, the material shall be subjected to and satisfy the pressure and operability tests that would be required for a new component installed in the receiving ship, provided the design pressure rating is consistent with the intended end use.

6.5.2 MATERIAL CERTIFICATION LAPSED (SHIP IN INACTIVATION AVAILABILITY)

SSG 82

a. For SUBSAFE material identified prior to the Inactivation Availability start date, to be transferred following commencement of the availability, the following shall be accomplished:

(1) Prior to commencement of system disassembly, material identified for transfer must be included in an identification and transfer system designed for this application. This system must provide a means for tagging components to be transferred to preclude compromise of material control integrity through unauthorized re-entry. NAVSEA considers existing "tag-out" systems as an adequate template for this identification system; however, identification system tags must be durable and clearly discernible from existing "tag-out" system tags.

(2) Identification system tags must include, as a minimum:

(a) The statement that the component is SUBSAFE material, and that it is not to be removed until uniquely marked by the appropriate shipyard code.

(b) The ship number (e.g., SSBN 657).

(c) System and item identification (e.g., MIC number, ASW-1, etc.).

(d) Activity unique identifier (e.g., PHNSY-657-001).

(3) All departures, applicable technical variance documentation, the last accomplishment date and category of all applicable URO/MRC inspections, and all legible component markings shall be documented and supplied to the receiving activity. This documentation shall be maintained and filed with the REC package that installed the equipment on the receiving ship. For pre-SSN 688 Class ships, technical variance documentation should be interpreted as any supplemental drawings or data which describe nonstandard configurations or modifications.

b. For SUBSAFE material identified following commencement of the Inactivation Availability, the requirements of paragraph 6.5.3 are in effect.

c. If the SUBSAFE material to be transferred is designated for non-SUBSAFE end use, and if the removal is to be accomplished subsequent to the Inactivation Availability start date, applicable non-SUBSAFE transfer requirements are in effect.

d. Those fasteners removed which connect a transferred item to equipment or components remaining on board, such as valve flange fasteners, shall not be shipped with the item, since to do so needlessly complicates the certification process.

e. The receiving activity shall conduct material receipt inspection to verify the following:

(1) Attached material identification tag and material marking on the material matches the documentation provided from the removing activity.

(2) End use installation is consistent with the previous service parameters such as the design pressure rating, design temperature rating, or system applicability of the component.

f. The receiving activity must complete any URO/MRC inspections or any other maintenance due or overdue for the material. Any inspection not performed or other maintenance action not completed must be departed using the TYCOM departure from specification system.

g. The receiving activity must maintain documentation for receipt, inspection, installation and testing of the provided material.

h. The material will be installed using a REC.

6.5.3 MATERIAL RECERTIFICATION REQUIRED.

SSG 82

Material which does not satisfy the requirements of paragraph 6.5.1 or 6.5.2 shall require full component certification to all SUBSAFE program requirements prior to use. Documentation of this certification shall be traceable from the installing activity's REC.

6.6 CERTIFICATION MAINTENANCE RESPONSIBILITY.

Maintenance of SUBSAFE certification subsequent to initial certification requires a cooperative effort of all activities supporting work within the SUBSAFE Certification Boundary. This includes Forces Afloat as well as NAVSEA managed activities. The following paragraphs identify the responsibilities,

in addition to the audit and test and trials responsibilities identified in Chapter 5, necessary for maintaining certification.

6.6.1 TYPE COMMANDER RESPONSIBILITIES.

To control material conditions in support of unrestricted operations of each certified submarine to design test depth during the operating cycle, the Type Commander's responsibility is to ensure that the certification maintenance requirements established in this manual are met. These requirements include the following:

a. Ensuring that where re-entry of a system or a portion of a system that was certified is necessary, re-entry control procedures in accordance with Section 6.3.2 are implemented.

b. Verifying that all work within the SUBSAFE Certification Boundary is accomplished in accordance with this manual.

c. Ensuring that all departures from the certification requirements are fully documented in an auditable form.

d. Verifying that the periodic maintenance actions, as specified in Section 6.4 and the supporting MRCs developed for each submarine, are accomplished.

e. Ensuring accountability of MRCs, on a ship-by-ship basis, is maintained and auditable systems for scheduling, performing, and reporting MRCs are established.

f. Ensuring that individual submarines report changes to SUBSAFE Selected Record Drawings and Data to the Planning Yards as delineated in this manual.

6.6.2 NAVSEA RESPONSIBILITIES.

To maintain certification in those boundaries worked by NAVSEA managed field activities or Type Commanders subsequent to the initial SUBSAFE certification, NAVSEA's responsibilities include:

a. Ensuring that all necessary specifications and requirements pertaining to SUBSAFE certification are current and available for inclusion in the depot work package, including documentation requirements (e.g., MRCs, flexibility analysis, etc.).

b. Ensuring that systems exist which provide certified government furnished material needed to support a major depot availability.

c. Conducting periodic audits in support of the major depot availability.

d. Reviewing and approving component and system designs.

e. Providing guidance and support, upon request from the Type Commanders, in the conduct of audits.

f. Assisting in audits of activities under control of the Type Commander upon request from the Type Commander.

6.6.3 SHIPYARD RESPONSIBILITIES.

6.6.3.1 SCHEDULED AVAILABILITIES.

To maintain certification in those boundaries worked on during an availability of a certified submarine, the shipyard’s responsibilities include:

a. Obtaining the ship's SSCB Book, Mapping Drawings, and other required technical data from the Planning Yard sufficiently in advance of the scheduled availability to permit adequate planning and material procurement.

b. Making the necessary installations, repairs, modifications, and inspections within the SUBSAFE Certification Boundary to the requirements of this manual and other governing specifications, standards, and directives.

c. Implementing re-entry control procedures in accordance with the requirements of this manual.

d. Performing a design review in the affected areas, when alterations are made to any system within the SUBSAFE Certification Boundary requiring design review by this manual. This design review shall be submitted to NAVSEA in accordance with NAVSEA 0941-LP-041-3010.

e. Documenting, in a form suitable for audit, all work accomplished within the SUBSAFE Certification Boundary.

f. Updating and delivering all Selected Record Drawings and Data in accordance with the requirements of this manual.

g. Invoking a written agreement delineating submarine versus shipyard SUBSAFE responsibilities in accordance with paragraph 6.3.2.1.

6.6.3.2 EMERGENT OR UNSCHEDULED AVAILABILITIES.

To maintain certification in those boundaries worked on during an emergent or unscheduled availability of a certified submarine, the shipyard’s responsibilities include:

a. Making the necessary installations, repairs, modifications, and inspections within the SUBSAFE Certification Boundary to the requirements of this manual and other governing specifications, standards, and directives.

b. Implementing re-entry control procedures in accordance with the requirements of this manual.

c. Documenting, in a form suitable for audit, all work accomplished within the SUBSAFE Certification Boundary.

d. Updating and delivering all Selected Record Drawings and Data in accordance with the requirements of this manual.

e. Invoking a written agreement delineating submarine versus shipyard SUBSAFE responsibilities in accordance with paragraph 6.3.2.1.

6.6.4 SUPERVISING AUTHORITY RESPONSIBILITIES.

To maintain certification in those boundaries worked on during a major depot availability of a submarine subsequent to initial SUBSAFE certification, the Supervising Authority's responsibilities include:

a. Ensuring that the ship's SSCB Book, Mapping Drawings, and other required technical data are requested from the Planning Yard sufficiently in

advance of the scheduled major availability to permit adequate planning and material procurement.

b. Ensuring that the necessary installations, repairs, modifications, and inspections within the SUBSAFE Certification Boundary are made to the requirements of this manual and other governing specifications, standards, and directives.

c. Monitoring re-entry control procedures where re-entry of a certified system or a portion of a system is necessary.

d. Ensuring that a design review has been made in the affected areas, where alterations are made to any system within the SUBSAFE Certification Boundary requiring design review. This design review shall be submitted to NAVSEA in accordance with NAVSEA 0941-LP-041-3010. This review shall include all work, including Forces Afloat work.

e. Providing the Ship's Force with recommended changes to closure instructions (rig for dive and rig for deep submergence) as a result of alterations accomplished during the major depot availability. This is to assist the Commanding Officer in the preparation of ship's operating instructions.

f. Ensuring that all Selected Record Drawings and Data are updated and delivered in accordance with the requirements of this manual.

g. Submitting message reports as required by Chapter 5.

h. Invoking a written agreement delineating submarine versus shipyard SUBSAFE responsibilities in accordance with paragraph 6.3.2.1.

6.6.5 REPAIR ACTIVITIES' RESPONSIBILITIES.

To maintain certification in the SUBSAFE Certification Boundary, the repair activity's (including Ship Repair Facilities and TYCOM responsible activities) responsibilities include:

a. Making the necessary installations, repairs, modifications, and inspections within the SUBSAFE Certification Boundary to the requirements of this manual and other governing specifications, standards, and directives.

b. Submitting to NAVSEA, via the Type Commander when appropriate, any proposed modification within the boundaries not previously approved by NAVSEA.

c. Implementing re-entry control procedures where re-entry of a SUBSAFE certified system or portion of a system is necessary.

d. Ensuring that when work is accomplished using a REC number obtained from the ship's re-entry control log, a copy of the completed REC is forwarded to the ship, and the original REC and all supporting certification documentation is maintained at the responsible activity.

e. Reporting, upon completion of work, to the appropriate authority that SUBSAFE certification has been sustained in all areas worked on by the activity.

f. Updating and delivering all Selected Record Drawings and Data in accordance with the requirements of this manual.

SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

APPENDIX A

REQUEST FORM FOR PROPOSED CHANGES TO THE SUBSAFE REQUIREMENTS MANUAL

A.1 GENERAL.

Proposed changes to this manual shall be submitted using the SUBSAFE Manual Change Request (MCR) Form, Figure A-1. Change requests shall include specific recommended change wording, with detailed rationale or justification. References to this manual shall utilize the referencing methodology of paragraph 1.7. Change requests shall also identify known impacts of the recommended change upon related reference documentation (A sample filled-out MCR form is provided as Figure A-2). Completed forms should be submitted directly to NAVSEA 92Q at the following address:

Commander, Naval Sea Systems Command
National Center Building No. 3
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

Attention: SEA 92Q

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SUBSAFE MANUAL CHANGE REQUEST (MCR) FORM

MANUAL REVISION/CHANGE/ACN AGAINST WHICH RECOMMENDED CHANGE IS WRITTEN:	ORIGINATING ACTIVITY: (ADDRESS)
PRIMARY MANUAL CHAPTER/SECTION/PARAGRAPH IMPACTED BY RECOMMENDED CHANGE:	
OTHER MANUAL SECTIONS AFFECTED:	POINT OF CONTACT: COMMERCIAL: DSN:

***RECOMMENDED CHANGE*:**

***RATIONALE/JUSTIFICATION*:**

RELATED DOCUMENTATION: (This includes any references or documents which may be affected by recommended change).

ORIGINATOR'S SIGNATURE:	DATE:

FIGURE A-1
(THIS FORM MAY BE REPRODUCED LOCALLY)

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SUBSAFE MANUAL CHANGE REQUEST (MCR) FORM

MANUAL REVISION/CHANGE/ACN AGAINST WHICH RECOMMENDED CHANGE IS WRITTEN:	ORIGINATING ACTIVITY: (ADDRESS)
Revision C	Commander, (Code 234S) XXXXXX Naval Shipyard XXXXXX, OO 98765-4321
PRIMARY MANUAL CHAPTER/SECTION/PARAGRAPH IMPACTED BY RECOMMENDED CHANGE: Paragraph 5.5	
OTHER MANUAL SECTIONS AFFECTED: None	POINT OF CONTACT: John A. Doe COMMERCIAL: (123)456-7890 DSN: 222-7890

***RECOMMENDED CHANGE*:**

Paragraph 5.5, eighth line, add "or MIL-I-45208, as applicable" after MIL-Q-9858.

***RATIONALE/JUSTIFICATION*:**

Not all contractors have quality programs which comply with MIL-Q-9858, nor is this always required. This recommendation is consistent with the Naval Shipyard Quality Program Manual, NAVSEA-TL-AA-STD-010, Section 3.2, and the Material Control Standard (Non-nuclear), NAVSEA 0948-LP-045-7010, paragraph 1.1.2.

RELATED DOCUMENTATION: (This includes any references or documents which may be affected by recommended change).

NAVSEA-TL-AA-STD-010, Sect. 3.2
NAVSEA-0948-LP-045-7010, para. 1.1.2

ORIGINATOR'S SIGNATURE:	DATE:

FIGURE A-2

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SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

APPENDIX B

SAMPLE MESSAGE FORMATS FOR SEA TRIALS AND SUBMARINE SAFETY CERTIFICATION

B.l GENERAL.

Ref: (a) OPNAVINST 9080.3, Subj: Tests and Trial of Naval Nuclear Powered Ships Under Construction, Modernization, Conversion, Refueling and Overhaul; Procedures for
(b) OPNAVINST C9110.1, Subj: Submarine Tests and Operating Depths; Policy Concerning

Reference (a) requires message reporting of satisfactory completion of authorized work prior to commencement of post repair trials. Reference (b) requires that NAVSEA certify completion of the SUBSAFE Work Package. In the following paragraphs, sample messages are provided for use in complying with the above requirements. The content of the messages shall be as provided. Additional wording to describe specific conditions and addees may be provided as applicable.

Information enclosed by carets "<>" provides general guidance for the specific information required by the submitting activity.

The square brackets "[]" contain reference to the Chapter 5 responsibility paragraph requirement for each sample message and the "{}" brackets contain the reference Appendix B sample message.

NOTES

1. The message content provided may be communicated in a letter format to facilitate timely transmission by electronic facsimile.

2. Subject to Program Manager approval, cumulative lists of conditional Deviations and Waivers which are deemed too lengthy for messages may be communicated in a letter format, with the letter referenced by the applicable message.

B.2 NEW CONSTRUCTION

B.2.1 SUPERVISING AUTHORITY FAST CRUISE/ALPHA SEA TRIALS SAMPLE MESSAGE.

[5.6.1.2.c.(1)] From Supervising Authority to NAVSEA Concerning SUBSAFE Material Condition Readiness of Precommissioning Unit for Fast Cruise and Alpha Sea Trials

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMNAVSEASYSCOM WASHINGTON DC//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) SUBSAFE MATERIAL CONDITION READINESS FOR FAST CRUISE AND ALPHA SEA TRIALS OF PRECOMUNIT <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010 //
REF/B/LTR/NAVSEA/<*SER NO./DATE*>// (REFERENCE ADDITIONAL AUDIT REPORTS AS REQUIRED)

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS THE NAVSEA SUBSAFE CERTIFICATION AUDIT REPORT FOR <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THE COMPLETION OF ALL SUBSAFE WORK AND TESTING REQUIRED FOR COMMENCEMENT OF ALPHA SEA TRIALS.

2. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THAT ALL CAT I AUDIT RECOMMENDATIONS OF REF B HAVE BEEN SATISFACTORILY RESOLVED. THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list conditional Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event[(1)]>*.

3. IAW REF A, THE STATUS OF ALL INCOMPLETE CAT 1A AUDIT RECOMMENDATIONS OF REF B IS AS FOLLOWS:
A.
B.

4. <*SUPERVISING AUTHORITY*> REPORTS READINESS OF <*SHIP NAME/HULL NO.*> FOR COMMENCEMENT OF FAST CRUISE. OIC <*SHIP NAME/HULL NO.*> CONCURS.//

5. SUBJECT TO SATISFACTORY COMPLETION OF FAST CRUISE AND RESOLUTION OF MANDATORY DEFICIENCIES, <*SUPERVISING AUTHORITY*> CONSIDERS <*SHIP NAME/HULL NO.*> SUBSAFE MATERIAL CONDITION READINESS SATISFACTORY FOR COMMENCEMENT OF ALPHA SEA TRIALS.

Superscript:

(1) SEE NOTE 2.

B.2.2 NAVSEA ALPHA SEA TRIALS SAMPLE MESSAGE.

[5.6.1.1.d] From NAVSEA to TYCOM Concerning Precommissioning Unit Material Condition Readiness and Depth Recommendation for Alpha Sea Trials

FROM: COMNAVSEASYSCOM WASHINGTON DC//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMNAVSEASYSCOM//

SUBJ/(SUBS) MATERIAL CONDITION READINESS AND DEPTH RECOMMENDATION FOR ALPHA SEA TRIALS OF PRECOMUNIT <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/DOC/OPNAVINST 9080.3//
REF/C/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.2.1}
REF/D/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>//
REF/E/LTR/SUB<*LANT/PAC*>/<*SER NO./DATE*>//
REF/F/LTR/NAVSEA/<*SER NO./DATE*>//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B CONTAINS PROCEDURES FOR TESTS AND TRIALS OF NAVAL NUCLEAR POWERED SHIPS. REF C IS <*SUPERVISING AUTHORITY*> MSG REPORTING SUBSAFE MATERIAL CONDITION READINESS OF <*SHIP NAME/HULL NO.*> FOR FAST CRUISE AND ALPHA SEA TRIALS. REF D REPORTED THE MATERIAL READINESS OF THE SHIP TO COMMENCE FAST CRUISE AND SEA TRIALS. REF E CONCURRED WITH THE ALPHA SEA TRIALS AGENDA FOR <*SHIP NAME/HULL NO.*>. REF F APPROVED THE ALPHA SEA TRIALS AGENDA FOR <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REFS A AND B, AND AS REPORTED BY REFS C AND D, THE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS CERTIFIED SATISFACTORY FOR SEA TRIALS TO <_> PERCENT TEST DEPTH. RECOMMEND AUTHORIZED DIVING UNDER DELIBERATE AND CONTROLLED CONDITIONS TO <_> PERCENT TEST DEPTH IAW THE SEA TRIALS AGENDA CONCURRED IN BY REF E AND APPROVED BY REF F.

2. REQUEST NAVSEA PMS<__> BE INFO ADDEE ON ALL SEA TRIAL SITREPS.

B.2.3 SUPERVISING AUTHORITY FAST CRUISE COMPLETION SAMPLE MESSAGE.

[5.6.1.2.c.(2)] From Supervising Authority to TYCOM and NAVSEA Concerning Precommissioning Unit Fast Cruise Completion and Readiness for ALPHA Sea Trials.

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//
COMNAVSEASYSCOM WASHINGTON DC

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) PRECOMUNIT <*SHIP NAME/HULL NO.*> FAST CRUISE COMPLETION AND READINESS FOR ALPHA SEA TRIALS//

REF/A/DOC/OPNAVINST 9080.3//

NARR/REF A CONTAINS PROCEDURES FOR TESTS AND TRIALS OF NAVAL NUCLEAR POWERED SHIPS.//

RMKS/1. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS <*SHIP NAME/HULL NO.*> FAST CRUISE SUCCESSFULLY COMPLETED AT <*TIME, DATE*>.

2. NO MANDATORY DEFICIENCIES FOR SEA TRIALS HAVE BEEN IDENTIFIED. THERE HAVE BEEN NO RECS OPENED AND NO SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE THE START OF FAST CRUISE. *<or, report any mandatory deficiencies discovered with corrective action, and if RECs and/or Deviations and Waivers were processed since the start of Fast Cruise, report ALL RECs OPENED SINCE THE START OF FAST CRUISE ARE CLOSED AND/OR ALL SUBSAFE DEVIATIONS AND WAIVERS RESOLVED.>*.

3. THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list conditional Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event.*[(1)]*>*.

4. RECOMMEND COMMENCEMENT OF ALPHA SEA TRIALS AS SCHEDULED. OIC <*SHIP NAME/HULL NO.*> CONCURS.//

Superscript:

[(1)] SEE NOTE 2.

B.2.4 TYCOM ALPHA SEA TRIALS SAMPLE MESSAGE.

[5.6.1.3.d] From TYCOM to Precommissioning Unit Concerning Alpha Sea Trials Depth Authorization

FROM: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

TO: PRECOMUNIT <*SHIP NAME*>//

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMSUB<*LANT/PAC*>//

SUBJ/(SUBS) PRECOMUNIT <*SHIP NAME/HULL NO.*> ALPHA SEA TRIALS DEPTH AUTHORIZATION//

REF/A/MSG/COMNAVSEASYSCOM/<*DTG*>// {B.2.2}
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<DTG>//{B.2.3}
REF/C/LTR/COMSUB<*LANT/PAC*>/<*SER NO./DATE*>//
REF/D/LTR/NAVSEA/<*SER NO./DATE*>//

NARR/REF A IS NAVSEA MATERIAL CONDITION READINESS REPORT AND ALPHA SEA TRIALS DEPTH RECOMMENDATION FOR <*SHIP NAME/HULL NO.*>. REF B IS <SUPERVISING AUTHORITY> REPORT OF FAST CRUISE COMPLETION AND READINESS FOR ALPHA SEA TRIALS. REF C CONCURRED WITH THE SEA TRIALS AGENDA. REF D APPROVED THE SEA TRIALS AGENDA.//

RMKS/1. REF A CERTIFIED THE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> SATISFACTORY FOR ALPHA SEA TRIALS TO <_> PERCENT TEST DEPTH.

2. REF B REPORTED SUCCESSFUL COMPLETION OF FAST CRUISE AND READINESS TO PROCEED ON ALPHA SEA TRIALS.

3. <*SHIP NAME/HULL NO.*> IS AUTHORIZED TO DIVE UNDER DELIBERATE AND CONTROLLED CONDITIONS TO <_> PERCENT TEST DEPTH IAW THE ALPHA SEA TRIALS AGENDA CONCURRED IN BY REF C AND APPROVED BY REF D.//

4. THIS DEPTH AUTHORIZATION IS AUTOMATICALLY SUSPENDED UPON RE-ENTRY TO THE SUBSAFE CERTIFICATION BOUNDARY OR CASUALTY AFFECTING RECOVERABILITY, SALVAGE, WATERTIGHT INTEGRITY, OR OPERATION OF SHIP'S CONTROL SURFACES. THE SHIP SHALL NOT OPERATE AT A DEPTH GREATER THAN 200 FEET UNTIL RE-ENTRY IS CERTIFIED TO TYCOM AND TYCOM GRANTS APPROVAL TO OPERATE TO PREVIOUSLY AUTHORIZED DEPTH.

B.2.5 SUPERVISING AUTHORITY BRAVO AND SUBSEQUENT SEA TRIALS SAMPLE MESSAGE.

[5.6.1.2.c.(3)] From Supervising Authority to NAVSEA Concerning Precommissioning Unit Completion of Alpha Sea Trials and Readiness for Bravo and Subsequent Sea Trials

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMNAVSEASYSCOM WASHINGTON DC//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) COMPLETION OF <*ALPHA*(2)> SEA TRIALS OF PRECOMUNIT<*SHIP NAME/HULL NO.*> AND READINESS FOR <*BRAVO*(1)> SEA TRIALS//

REF/A/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.2.1}
REF/B/LTR/NAVSEA/<*SER NO./DATE*>
REF/C/DOC/NAVSEA 0924-062-0010//

NARR/REF A IS <*SUPERVISING AUTHORITY'S*> REPORT OF READINESS OF <*SHIP NAME/HULL NO.*> FOR FAST CRUISE AND ALPHA SEA TRIALS. REF B IS SUBSAFE CERTIFICATION AUDIT REPORT.// REF C IS THE SUBSAFE REQUIREMENTS MANUAL.//

RMKS/1. <*SHIP NAME/HULL NO.*> HAS SUCCESSFULLY COMPLETED <*ALPHA*(2)> SEA TRIALS.

2. BY REF A, <*SUPERVISING AUTHORITY*> REPORTED ALL CAT I AUDIT RECOMMENDATIONS OF REF B SATISFACTORILY RESOLVED. THERE HAVE BEEN NO RECS OPENED AND NO SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE <*ALPHA*(2)> SEA TRIALS. *<or, if RECs or Deviations and Waivers were processed since the start of <ALPHA(2)> Sea Trials, report ALL RECS OPENED SINCE THE START OF <ALPHA(2)> SEA TRIALS ARE CLOSED AND/OR ALL SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE <ALPHA(2)> SEA TRIALS ARE RESOLVED.>*.

3. THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list conditional Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event.*(3)*>*

4. THE STATUS OF REF B INCOMPLETE CAT 1A AUDIT RECOMMENDATIONS IS <SAME AS REPORTED BY REF A OR AS FOLLOWS:>.

5. IAW REF C, <*SUPERVISING AUTHORITY*> REPORTS THAT THE SUBSAFE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS SATISFACTORY FOR <*BRAVO*(1)> SEA TRIALS TO TEST DEPTH. OIC <*SHIP NAME/HULL NO.*> CONCURS.//

Superscripts:

(1) UPCOMING TRIALS WHICH IS SUBJECT OF THIS CERTIFICATION (E.G., BRAVO SEA TRIALS, CHARLIE SEA TRIALS, INSURV TRIALS, ETC.).
(2) PREVIOUS TRIALS.
(3) SEE NOTE 2.

B.2.6 NAVSEA BRAVO AND SUBSEQUENT SEA TRIALS SAMPLE MESSAGE.

[5.6.1.1.e] From NAVSEA to TYCOM Concerning Precommissioning Unit SUBSAFE Material Condition Readiness for Bravo and Subsequent Sea Trials

FROM: COMNAVSEASYSCOM WASHINGTON DC//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR*>

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>
<*SUPERVISING AUTHORITY*>

UNCLAS// N09094 //

MSGID/GENADMIN/COMNAVSEASYSCOM//

SUBJ/(SUBS) SUBSAFE MATERIAL CONDITION READINESS AND DEPTH RECOMMENDATION FOR <*BRAVO*[(1)]> SEA TRIALS OF <*SHIP NAME*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.2.5}
REF/C/LTR/COMSUB<*LANT/PAC*>/<*SER NO./DATE*>//
REF/D/LTR/NAVSEA/<*SER NO./DATE*>//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS <*SUPERVISING AUTHORITY*> REPORT OF <*SHIP NAME/HULL NO.*> COMPLETION OF <*ALPHA*[(2)]> SEA TRIALS AND READINESS FOR <*BRAVO*[(1)]> SEA TRIALS. REF C CONCURRED WITH THE <*BRAVO*[(1)]> SEA TRIALS AGENDA FOR <*SHIP NAME/HULL NO.*>. REF D APPROVED THE <*BRAVO*[(1)]> SEA TRIALS AGENDA FOR <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REF A, AND AS REPORTED BY REF B, THE SUBSAFE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS CERTIFIED SATISFACTORY FOR SEA TRIALS TO TEST DEPTH.

2. RECOMMEND AUTHORIZED DIVING UNDER DELIBERATE AND CONTROLLED CONDITIONS IAW THE <*BRAVO*[(1)]> SEA TRIALS AGENDA CONCURRED IN BY REF C AND APPROVED BY REF D.

3. REQUEST NAVSEA PMS<__> BE INFO ADDEE ON ALL SEA TRIAL SITREPS.

Superscript:

[(1)] UPCOMING TRIALS WHICH IS SUBJECT OF THIS CERTIFICATION (E.G., BRAVO SEA TRIALS, CHARLIE SEA TRIALS, INSURV TRIALS, ETC.).
[(2)] PREVIOUS TRIALS

B.2.7 TYCOM BRAVO AND SUBSEQUENT SEA TRIALS SAMPLE MESSAGE.

[5.6.1.3.d] From TYCOM to Precommissioning Unit Concerning Bravo and Subsequent Sea Trials Depth Authorization

FROM: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

TO: PRECOMUNIT <*SHIP NAME*>//

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMSUB<*LANT/PAC*>//

SUBJ/(SUBS) PRECOMUNIT <*SHIP NAME/HULL NO.*> <*BRAVO*[(1)]> SEA TRIALS DEPTH AUTHORIZATION

REF/A/MSG/COMNAVSEASYSCOM/<*DTG*>// {B.2.6}
REF/B/DOC/COMSUB<LANT/PAC>NOTE C3120//
REF/C/LTR/COMSUB<*LANT/PAC*><*SER NO./DATE*>//
REF/D/LTR/NAVSEA/<*SER NO./DATE*>//

NARR/REF A IS NAVSEA REPORT OF <*SHIP NAME/HULL NO.*> SUBSAFE MATERIAL CONDITION READINESS AND DEPTH RECOMMENDATION FOR <*BRAVO*[(1)]> SEA TRIALS. REF B CONTAINS COMSUB<LANT/PAC> AUTHORIZED SUBMARINE OPERATING AND TEST DEPTHS. REF C CONCURRED IN THE <*BRAVO*[(1)]> SEA TRIALS AGENDA FOR <*SHIP NAME/HULL NO.*>. REF D APPROVED THE <*BRAVO*[(1)]> SEA TRIALS AGENDA FOR <*SHIP NAME/HULL NO.*>.//

RMKS/1. REF A CERTIFIED THAT THE SUBSAFE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS SATISFACTORY FOR <*BRAVO*[(1)]> SEA TRIALS TO TEST DEPTH.

2. SUBJECT TO THE RESTRICTIONS OF REFS A AND B, <*SHIP NAME/HULL NO.*> IS AUTHORIZED TO DIVE UNDER DELIBERATE AND CONTROLLED CONDITIONS TO TEST DEPTH IAW THE <*BRAVO*[(1)]> SEA TRIALS AGENDA CONCURRED IN BY REF C AND APPROVED BY REF D.//

3. THIS DEPTH AUTHORIZATION IS AUTOMATICALLY SUSPENDED UPON RE-ENTRY TO THE SUBSAFE CERTIFICATION BOUNDARY OR CASUALTY AFFECTING RECOVERABILITY, SALVAGE, WATERTIGHT INTEGRITY, OR OPERATION OF SHIP'S CONTROL SURFACES. THE SHIP SHALL NOT OPERATE AT A DEPTH GREATER THAN 200 FEET UNTIL RE-ENTRY IS CERTIFIED TO TYCOM AND TYCOM GRANTS APPROVAL TO OPERATE TO PREVIOUSLY AUTHORIZED DEPTH.

Superscript:

(1) UPCOMING TRIALS WHICH IS SUBJECT OF THIS CERTIFICATION (E.G., BRAVO SEA TRIALS, CHARLIE SEA TRIALS, INSURV TRIALS, ETC.).

B.2.8 SUPERVISING AUTHORITY URO SAMPLE MESSAGE.

[5.6.1.2.d.] From Supervising Authority to NAVSEA Concerning Precommissioning Unit SUBSAFE Material Condition Relative to URO

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMNAVSEASYSCOM WASHINGTON DC//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) UNRESTRICTED OPERATIONS FOR <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>//{B.2.1}
REF/C/LTR/NAVSEA/<*SER NO./DATE*>// (REFERENCE ADDITIONAL AUDIT REPORTS AS REQUIRED)

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS <SUPERVISING AUTHORITY> REPORT OF <*SHIP NAME/HULL NO.*> READINESS FOR FAST CRUISE AND ALPHA SEA TRIALS. REF C IS THE NAVSEA SUBSAFE CERTIFICATION AUDIT REPORT FOR <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THE SATISFACTORY COMPLETION OF ALL SEA TRIALS, COMPLETION OF CONTROLLED DIVES AND THE RESOLUTION OF MANDATORY SEA TRIAL DEFICIENCIES, <*AND SATISFACTORY RESOLUTION OF ANY SHIPS FORCE RECS.*>

2. REF B REPORTED SATISFACTORY RESOLUTION OF ALL CAT I AUDIT RECOMMENDATIONS OF REF C. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THAT ALL CAT IA AUDIT RECOMMENDATIONS OF REF C HAVE BEEN SATISFACTORILY RESOLVED. THERE IS NO DEFERRED SUBSAFE WORK AND THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list deferred SUBSAFE work and/or conditional SUBSAFE Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event[(1)]>.*

3. THE STATUS OF INCOMPLETE CAT II AUDIT RECOMMENDATIONS OF REF C IS AS FOLLOWS:
A.
B.

4. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THE SUBSAFE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS SATISFACTORY FOR UNRESTRICTED OPERATIONS TO TEST DEPTH.//

Superscript:

(1) SEE NOTE 2.

B.2.9 NAVSEA URO SAMPLE MESSAGE.

[5.6.1.1.f] From NAVSEA to TYCOM Concerning Precommissioning Unit Recommendation for URO

FROM: COMNAVSEASYSCOM WASHINGTON DC//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
PRECOMUNIT <*SHIP NAME*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMNAVSEASYSCOM//

SUBJ/(SUBS) RECOMMENDATION FOR UNRESTRICTED OPERATIONS FOR <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<DTG>// {B.2.8}
REF/C/DOC/OPNAVINST 9110.1//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS <SUPERVISING AUTHORITY> REPORT OF <SHIP NAME/HULL NO.> SUBSAFE MATERIAL CONDITION READINESS FOR URO. REF C CONTAINS POLICY FOR SUBMARINE TEST AND OPERATING DEPTHS.//

RMKS/1. IAW REF A, REF B REPORTED THE SUBSAFE MATERIAL CONDITION READINESS OF <*SHIP NAME/HULL NO.*> IS SATISFACTORY AND NO OUTSTANDING DEPTH LIMITING DISCREPANCIES EXIST.

2. REF B ALSO REPORTED SATISFACTORY COMPLETION OF ALL SEA TRIALS, COMPLETION OF CONTROLLED DIVES AND RESOLUTION OF MANDATORY SEA TRIAL DEFICIENCIES.

3. IAW REFS A AND C, NAVSEA CERTIFIES THAT THE SUBSAFE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS SATISFACTORY AND RECOMMENDS THAT THE SHIP BE AUTHORIZED UNRESTRICTED OPERATIONS TO TEST DEPTH SUBJECT TO COMPLIANCE WITH REF A <*WITH THE FOLLOWING RESTRICTIONS: list any restrictions which may be applicable.*>.

4. URO/MRC PERIODICITIES REQUIRED BY REF A SHALL COMMENCE ON <*DATE*>.

B.2.10 TYCOM URO SAMPLE MESSAGE.

[5.6.1.3.e] From TYCOM to Precommissioning Unit Concerning URO

FROM: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

TO: PRECOMUNIT <*SHIP NAME*>//

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSG/GENADMIN/COMSUB<*LANT/PAC*>//

SUBJ/(SUBS) UNRESTRICTED OPERATIONS OF PRECOMUNIT <*SHIP NAME/HULL NO.*>//

REF/A/MSG/NAVSEA/<*DTG*>// {B.2.9}
REF/B/DOC/NAVSEA 0924-062-0010//
REF/C/DOC/COMSUB<*LANT/PAC*>NOTE C3120//

NARR/REF A IS NAVSEA URO MSG FOR <*SHIP NAME/HULL NO.*>. REF B IS THE SUBSAFE REQUIREMENTS MANUAL. REF C CONTAINS COMSUB<*LANT/PAC*> AUTHORIZED SUBMARINE OPERATING AND TEST DEPTHS.//

RMKS/1. REF A CERTIFIED THE SUBSAFE MATERIAL CONDITION OF <*SHIP NAME/HULL NO.*> IS SATISFACTORY AND RECOMMENDED THAT <*SHIP NAME/HULL NO.*> BE AUTHORIZED TO CONDUCT UNRESTRICTED OPERATIONS TO TEST DEPTH.

2. <*SHIP NAME/HULL NO.*> IS AUTHORIZED TO CONDUCT OPERATIONS TO TEST DEPTH SUBJECT TO THE FOLLOWING RESTRICTIONS: <*list restrictions if they exist or state "NONE"*>

3. CONTINUED CERTIFICATION FOR OPERATIONS TO TEST DEPTH IS SUBJECT TO COMPLIANCE WITH REF B. URO/MRC PERIODICITIES COMMENCE ON <*DATE*>.

4. THIS MSG REMAINS IN EFFECT UNTIL INCLUDED IN A FUTURE REVISION OF REF C.//

B.3 MAJOR DEPOT AVAILABILITY

B.3.1 SUPERVISING AUTHORITY FAST CRUISE/SEA TRIALS SAMPLE MESSAGE.

[5.6.2.2.d.(1)] From Supervising Authority to NAVSEA and TYCOM Concerning SUBSAFE and Material Condition Readiness for Fast Cruise/Sea Trials

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMNAVSEASYSCOM WASHINGTON DC//
COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) SUBSAFE AND MATERIAL CONDITION READINESS FOR FAST CRUISE AND SEA TRIALS OF USS <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/DOC/OPNAVINST 9080.3//
REF/C/LTR/NAVSEA <*SER NO./DATE*>// (Reference additional audit reports as required)

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B CONTAINS PROCEDURES FOR TESTS AND TRIALS OF NAVAL NUCLEAR POWERED SHIPS. REF C IS NAVSEA SUBSAFE CERTIFICATION AUDIT REPORT FOR USS <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REFS A AND B, <*SUPERVISING AUTHORITY*> CERTIFIES THE MATERIAL CONDITION OF THOSE PARTS OF <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED AND/OR TESTED BY THE SHIPYARD SATISFACTORY FOR POST REPAIR SEA TRIALS.

2. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THAT ALL CAT I AUDIT RECOMMENDATIONS OF REF C HAVE BEEN SATISFACTORILY RESOLVED. THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list conditional Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event*[(1)]>.

3. IAW REF A, THE STATUS OF INCOMPLETE CAT IA AUDIT RECOMMENDATIONS OF REF C IS AS FOLLOWS:
A.
B.

4. <*SUPERVISING AUTHORITY*> REPORTS READINESS OF USS <*SHIP NAME/HULL NO.*> FOR COMMENCEMENT OF FAST CRUISE. CO USS <*SHIP NAME/HULL NO.*> CONCURS.//

5. SUBJECT TO SATISFACTORY COMPLETION OF FAST CRUISE AND RESOLUTION OF MANDATORY DEFICIENCIES <*SUPERVISING AUTHORITY*> CONSIDERS USS <*SHIP NAME/HULL NO.*> MATERIAL CONDITION READINESS SATISFACTORY FOR COMMENCEMENT OF SEA TRIALS.

Superscript:

(1) SEE NOTE 2.

B.3.2 NAVSEA SEA TRIALS SAMPLE MESSAGE.

[5.6.2.1.d] From NAVSEA to TYCOM Concerning SUBSAFE Material Condition Readiness and Depth Recommendation for Sea Trials

FROM: COMNAVSEASYSCOM WASHINGTON DC//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMNAVSEASYSCOM//

SUBJ/(SUBS) SUBSAFE MATERIAL CONDITION READINESS AND DEPTH RECOMMENDATION FOR SEA TRIALS OF USS <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.3.1}
REF/C/LTR/NAVSEA <*SER NO./DATE*>//
REF/D/LTR/COMSUB<*LANT/PAC*><*SER NO./DATE*>//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS <*SUPERVISING AUTHORITY*> REPORT OF READINESS OF <*SHIP NAME/HULL NO.*> FOR FAST CRUISE AND SEA TRIALS. REF C CONCURRED IN SEA TRIAL AGENDA FOR USS <*SHIP NAME/HULL NO.*>. REF D APPROVED THE SEA TRIAL AGENDA FOR USS <*SHIP NAME/HULL NO.*>//

RMKS/1. IAW REF A, AND AS REPORTED BY REF B, THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS CERTIFIED SATISFACTORY FOR SEA TRIALS TO TEST DEPTH.

2. SUBJECT TO CONFIRMATION BY TYCOM THAT CERTIFICATION REQUIREMENTS OF REF A HAVE BEEN SUSTAINED FOR THE REMAINDER OF THE SUBSAFE CERTIFICATION BOUNDARY, RECOMMEND AUTHORIZED DIVING UNDER DELIBERATE AND CONTROLLED CONDITIONS TO TEST DEPTH IAW THE SEA TRIAL AGENDA CONCURRED IN BY REF C AND APPROVED BY REF D <*SUBJECT TO THE FOLLOWING RESTRICTIONS: list any restrictions which may be applicable*>.

3. REQUEST NAVSEA PMS<__> BE INFO ADDEE ON ALL SEA TRIAL SITREPS.

B.3.3 SUPERVISING AUTHORITY FAST CRUISE COMPLETION SAMPLE MESSAGE.

[5.6.2.2.d.(2)] From Supervising Authority to TYCOM and NAVSEA Concerning Fast Cruise Completion and SUBSAFE Material Condition Readiness for Sea Trials.

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//
COMNAVSEASYSCOM WASHINGTON DC

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//
SUBJ/(SUBS) USS <*SHIP NAME/HULL NO.*> FAST CRUISE COMPLETION//

REF/A/DOC/NAVSEA 0924-062-0010//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL.//

RMKS/1. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS USS <*SHIP NAME/HULL NO.*> FAST CRUISE SUCCESSFULLY COMPLETED AT <*TIME, DATE*>.

2. NO MANDATORY DEFICIENCIES FOR SEA TRIALS HAVE BEEN IDENTIFIED. THERE HAVE BEEN NO RECS OPENED AND NO SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE THE START OF FAST CRUISE. *<or, report any mandatory deficiencies discovered with corrective action, and if RECs and/or Deviations and Waivers were processed since the start of Fast Cruise, report ALL RECS OPENED SINCE THE START OF FAST CRUISE ARE CLOSED AND/OR ALL SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE THE START OF FAST CRUISE ARE RESOLVED.>*

3. THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list conditional Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event.*[(1)]*>*.

4. IAW REF A, THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY FOR SEA TRIALS.

5. RECOMMEND COMMENCEMENT OF SEA TRIALS AS SCHEDULED. CO USS <*SHIP NAME/HULL NO.*> CONCURS.//

Superscript:

(1) SEE NOTE 2.

B.3.4 TYCOM FAST CRUISE/SEA TRIALS SAMPLE MESSAGE.

[5.6.2.3.d] From TYCOM to Ship Concerning Sea Trials Depth Authorization

FROM: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

TO: USS <*SHIP NAME*>//

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/ADMIN/COMSUB<*LANT/PAC*>//

SUBJ/(SUBS) USS <*SHIP NAME/HULL NO.*> SEA TRIALS DEPTH AUTHORIZATION//

REF/A/MSG/COMNAVSEASYSCOM/<*DTG*>//{B.3.2}
REF/B/MSG/SUPERVISING AUTHORITY/<*DTG*>//{B.3.3}
REF/C/LTR/NAVSEA <*SER NO./DATE*>//
REF/D/LTR/COMSUB<*LANT/PAC*>/<*SER NO./DATE*>//

NARR/REF A IS NAVSEA SUBSAFE MATERIAL CONDITION READINESS REPORT AND SEA TRIALS DEPTH RECOMMENDATION FOR USS <*SHIP NAME/HULL NO.*>. REF B IS <*SUPERVISING AUTHORITY*> REPORT OF USS <*SHIP NAME/HULL NO.*> FAST CRUISE COMPLETION AND READINESS FOR SEA TRIALS . REF C CONCURRED IN THE SEA TRIAL AGENDA FOR USS <*SHIP NAME/HULL NO.*>. REF D APPROVED THE SEA TRIAL AGENDA FOR USS <*SHIP NAME/HULL NO.*>.//

RMKS/1. REF A CERTIFIED THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY FOR SEA TRIALS TO TEST DEPTH.

2. THIS MESSAGE CONFIRMS THAT THE CERTIFICATION OF THE REMAINDER OF ITEMS WITHIN THE SUBSAFE CERTIFICATION BOUNDARY OF USS <*SHIP NAME/HULL NO.*> HAS BEEN SUSTAINED. ACCORDINGLY, THE STATUS OF THE SUBSAFE CERTIFICATION BOUNDARY OF USS <*SHIP NAME/HULL NO.*> IS SATISFACTORY FOR SEA TRIALS TO TEST DEPTH <*SUBJECT TO ANY RESTRICTIONS IN PARA 2 OF REF A if any are identified*>.

3. REF B REPORTED COMPLETION OF FAST CRUISE AND READINESS TO PROCEED ON SEA TRIALS.

4. USS <*SHIP NAME/HULL NO.*> IS AUTHORIZED TO DIVE UNDER DELIBERATE AND CONTROLLED CONDITIONS TO <*SPECIFIED*> DEPTH IAW THE SEA TRIAL AGENDA CONCURRED IN BY REF C AND APPROVED BY REF D.

5. THIS DEPTH AUTHORIZATION IS AUTOMATICALLY SUSPENDED UPON RE-ENTRY TO THE SUBSAFE CERTIFICATION BOUNDARY OR CASUALTY AFFECTING RECOVERABILITY, SALVAGE, WATERTIGHT INTEGRITY, OR OPERATION OF SHIP'S CONTROL SURFACES. THE SHIP SHALL NOT OPERATE AT A DEPTH GREATER THAN 200 FEET UNTIL RE-ENTRY IS CERTIFIED TO TYCOM AND TYCOM GRANTS APPROVAL TO OPERATE TO PREVIOUSLY AUTHORIZED DEPTH.

B.3.5 SUPERVISING AUTHORITY FOLLOW-ON SEA TRIALS SAMPLE MESSAGE.

[5.6.2.2.d.(3)] From Supervising Authority to NAVSEA Concerning Readiness for Follow-on Sea Trials in Cases Where a Previous Sea Trial was Aborted or Corrective Actions for Sea Trial Deficiencies Require an Additional Deep Dive

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMNAVSEASYSCOM WASHINGTON DC//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) READINESS FOR <*FOLLOW-ON*[(1)]> SEA TRIALS OF USS <*SHIP NAME/HULL NO.*>//

REF/A/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.3.1}
REF/B/LTR/NAVSEA<*SER NO./DATE*>//
REF/C/DOC/NAVSEA 0924-062-0010//

NARR/REF A IS <*SUPERVISING AUTHORITY*> REPORT READINESS OF USS <*SHIP NAME/HULL NO.*> FOR FAST CRUISE AND INITIAL SEA TRIALS. REF B IS THE SUBSAFE CERTIFICATION AUDIT REPORT. REF C IS THE SUBSAFE REQUIREMENTS MANUAL.//

RMKS/1. USS <*SHIP NAME/HULL NO.*> RETURNED FROM <*PREVIOUS*[(2)]> SEA TRIALS ON <*DATE*>.

2. BY REF A, <*SUPERVISING AUTHORITY*> REPORTED ALL CAT I AUDIT RECOMMENDATIONS OF REF B SATISFACTORILY RESOLVED. THERE HAVE BEEN NO SHIPYARD RECS OPENED AND NO SHIPYARD SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE <*PREVIOUS*[(2)]> SEA TRIALS. *<or, if RECS or Deviations and Waivers were processed since the previous sea trial, report ALL RECS OPENED SINCE (PREVIOUS*[(2)]*) SEA TRIALS ARE CLOSED AND/OR ALL SUBSAFE DEVIATIONS AND WAIVERS PROCESSED SINCE (PREVIOUS*[(2)]*) SEA TRIALS ARE RESOLVED*>.

3. THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. *<or list conditional Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event.*[(3)]*>*.

4. THE STATUS OF REF B INCOMPLETE CAT 1A AUDIT RECOMMENDATIONS IS <SAME AS REPORTED BY REF A OR AS FOLLOWS:>.

5. IAW REF C, <*SUPERVISING AUTHORITY*> REPORTS THAT THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY FOR <*FOLLOW-ON*[(1)]> SEA TRIALS TO TEST DEPTH. CO USS <*SHIP NAME/HULL NO.*> CONCURS.

Superscript:

(1) UPCOMING TRIAL WHICH IS SUBJECT OF THIS CERTIFICATION (E.G., SECOND SEA TRIAL, ETC).
(2) PREVIOUS TRIAL WHICH MAY HAVE BEEN COMPLETED OR ABORTED.
(3) SEE NOTE 2.

B.3.6 NAVSEA FOLLOW-ON SEA TRIALS SAMPLE MESSAGE.

[5.6.2.1.d] From NAVSEA to TYCOM Concerning Ship SUBSAFE Material Condition and Depth Recommendation for Follow-on Sea Trials

FROM: COMNAVSEASYSCOM WASHINGTON DC//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>
<*SUPERVISING AUTHORITY*>

UNCLAS / N09094 //

MSGID/GENADMIN/COMNAVSEASYSCOM//

SUBJ/(SUBS) SUBSAFE MATERIAL CONDITION READINESS AND DEPTH RECOMMENDATION FOR <*FOLLOW-ON*[(1)]> SEA TRIALS OF USS <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.3.5}
REF/C/LTR/NAVSEA <*SER NO./DATE*>//
REF/D/LTR/COMSUB<*LANT/PAC*>/<*SER NO./DATE*>//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS SUPERVISING AUTHORITY REPORT OF USS <*SHIP NAME/HULL NO.*> READINESS FOR <*FOLLOW-ON*[(1)]> SEA TRIALS. REF C CONCURRED IN THE <*FOLLOW-ON*[(1)]> SEA TRIAL AGENDA FOR USS <*SHIP NAME/HULL NO.*>. REF D APPROVED OF THE <*FOLLOW-ON*[(1)]> SEA TRIALS AGENDA FOR USS <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REF A, AND AS REPORTED BY REFERENCE REF B, THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS CERTIFIED SATISFACTORY FOR <*FOLLOW-ON*[(1)]> SEA TRIALS TO TEST DEPTH.

2. SUBJECT TO CONFIRMATION BY TYCOM THAT CERTIFICATION REQUIREMENTS OF REF A HAVE BEEN SUSTAINED FOR THE REMAINDER OF THE SUBSAFE CERTIFICATION BOUNDARY, NAVSEA RECOMMENDS AUTHORIZED DIVING UNDER DELIBERATE AND CONTROLLED CONDITIONS TO TEST DEPTH IAW THE <*FOLLOW-ON*[(1)]> SEA TRIALS AGENDA CONCURRED IN BY REF C AND APPROVED BY REF D. <*SUBJECT TO THE FOLLOWING RESTRICTIONS: list any restrictions which may be applicable*>.

3. REQUEST NAVSEA PMS<__> BE INFO ADDEE ON ALL SEA TRIAL SITREPS.

Superscript:

[(1)] UPCOMING TRIALS WHICH ARE SUBJECT OF THIS CERTIFICATION (E.G., SECOND SEA TRIALS, ETC.).

B.3.7 TYCOM FOLLOW-ON SEA TRIALS SAMPLE MESSAGE.

[5.6.2.3.d] From TYCOM to Ship Concerning Follow-on Sea Trials Depth Authorization

FROM: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

TO: USS <*SHIP NAME*>//

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMSUB<*LANT/PAC*>//

SUBJ/(SUBS) USS <*SHIP NAME/HULL NO.*> <*FOLLOW-ON*[(1)]> SEA TRIALS DEPTH AUTHORIZATION//

REF/A/MSG/COMNAVSEASYSCOM/<*DTG*>// {B.3.6}
REF/B/LTR/NAVSEA <*SER NO./DATE*>//
REF/C/LTR/COMSUB<*LANT/PAC*><*SER NO./DATE*>//

NARR/REF A IS NAVSEA SUBSAFE MATERIAL CONDITION READINESS REPORT AND <*FOLLOW-ON*[(1)]> SEA TRIALS DEPTH RECOMMENDATION FOR USS <*SHIP/HULL NO.*>. REF B CONCURRED IN THE <*FOLLOW-ON*[(1)]> SEA TRIALS AGENDA FOR USS <*SHIP NAME/HULL NO.*>. REF C APPROVED THE <*FOLLOW-ON*[(1)]> SEA TRIALS AGENDA FOR USS <*SHIP NAME/HULL NO.*>.//

RMKS/1. REF A CERTIFIED THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY FOR <*FOLLOW-ON*[(1)]> SEA TRIALS TO TEST DEPTH.

2. THIS MSG CONFIRMS THAT THE CERTIFICATION OF THE REMAINDER OF ITEMS WITHIN SUBSAFE CERTIFICATION BOUNDARY OF USS <*SHIP NAME/HULL NO.*> HAS BEEN SUSTAINED. ACCORDINGLY, THE STATUS OF THE SUBSAFE CERTIFICATION BOUNDARY OF USS <*SHIP NAME/HULL NO.*> IS SATISFACTORY FOR <*FOLLOW-ON*[(1)]> SEA TRIALS TO TEST DEPTH <*SUBJECT TO RESTRICTIONS IN PARA 2 OF REF A if any are identified*>.

3. USS <*SHIP NAME/HULL NO.*> IS AUTHORIZED TO DIVE UNDER DELIBERATE AND CONTROLLED CONDITIONS TO <*SPECIFIED*> DEPTH IAW THE <*FOLLOW-ON*[(1)]> SEA TRIALS AGENDA CONCURRED IN BY REF B AND APPROVED BY REF C.

4. THIS DEPTH AUTHORIZATION IS AUTOMATICALLY SUSPENDED UPON RE-ENTRY TO THE SUBSAFE CERTIFICATION BOUNDARY OR CASUALTY AFFECTING RECOVERABILITY, SALVAGE, WATERTIGHT INTEGRITY, OR OPERATION OF SHIP'S CONTROL SURFACES. THE SHIP SHALL NOT OPERATE AT A DEPTH GREATER THAN 200 FEET UNTIL RE-ENTRY IS CERTIFIED TO TYCOM AND TYCOM GRANTS APPROVAL TO OPERATE TO PREVIOUSLY AUTHORIZED DEPTH.

Superscript:

[(1)] UPCOMING TRIALS WHICH ARE SUBJECT OF THIS CERTIFICATION (E.G., SECOND SEA TRIALS, ETC.).

B.3.8 SUPERVISING AUTHORITY URO SAMPLE MESSAGE.

[5.6.2.2.e] From Supervising Authority to NAVSEA Concerning SUBSAFE Material Condition to Support URO

FROM: <*SUPERVISING AUTHORITY*>//

TO: COMNAVSEASYSCOM WASHINGTON DC//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>

UNCLAS // N09094 //

MSGID/GENADMIN/<*SUPERVISING AUTHORITY*>//

SUBJ/(SUBS) UNRESTRICTED OPERATIONS FOR USS <*SHIP NAME*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.3.1}
REF/C/LTR/NAVSEA <*SER NO./DATE*>//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS <*SUPERVISING AUTHORITY*> REPORT OF USS <*SHIP NAME/HULL NO.*> READINESS FOR FAST CRUISE AND SEA TRIALS. REF C IS THE NAVSEA SUBSAFE CERTIFICATION AUDIT REPORT FOR USS <*SHIP NAME/HULL NO.*>.//

RMKS/1. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THE SATISFACTORY COMPLETION OF ALL SEA TRIALS, COMPLETION OF CONTROLLED DIVES, AND THE RESOLUTION OF MANDATORY SEA TRIAL DEFICIENCIES.

2. REF B REPORTED SATISFACTORY RESOLUTION OF ALL CAT I AUDIT RECOMMENDATIONS OF REF C. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THAT ALL CAT IA AUDIT RECOMMENDATIONS OF REF C HAVE BEEN SATISFACTORILY RESOLVED. THERE IS NO DEFERRED SUBSAFE WORK AND THERE ARE NO SUBSAFE DEVIATIONS AND WAIVERS WITH CONDITIONS WHICH HAVE NOT BEEN SATISFIED. <*or list deferred SUBSAFE work and/or conditional SUBSAFE Deviations and Waivers including Deviation Number, Short Title, and Expected Clearance Date/Key Event*[(1)]>.

3. THE STATUS OF INCOMPLETE CAT II AUDIT RECOMMENDATIONS OF REF C IS AS FOLLOWS:
A.
B.

4. IAW REF A, <*SUPERVISING AUTHORITY*> REPORTS THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY FOR UNRESTRICTED OPERATIONS TO TEST DEPTH.//

Superscript:

(1) SEE NOTE 2.

B.3.9 NAVSEA URO SAMPLE MESSAGE.

[5.6.2.1.e] From NAVSEA to TYCOM Concerning Material Certification and Recommendation for URO

FROM: COMNAVSEASYSCOM//

TO: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR*>//

INFO CNO WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
USS <*SHIP NAME*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMNAVSEASYSCOM//

SUBJ/(SUBS) RECOMMENDATION FOR UNRESTRICTED OPERATIONS FOR USS <*SHIP NAME/HULL NO.*>//

REF/A/DOC/NAVSEA 0924-062-0010//
REF/B/MSG/<*SUPERVISING AUTHORITY*>/<*DTG*>// {B.3.8}
REF/C/DOC/OPNAVINST 9110.1//

NARR/REF A IS THE SUBSAFE REQUIREMENTS MANUAL. REF B IS <*SUPERVISING AUTHORITY*> REPORT OF SATISFACTORY SUBSAFE MATERIAL CONDITION OF USS <*SHIP NAME/HULL NO.*> FOR THOSE PARTS INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD. REF C CONTAINS POLICY FOR SUBMARINE TEST AND OPERATING DEPTHS.//

RMKS/1. IAW REF A, REF B REPORTED THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY FOR UNRESTRICTED OPERATIONS TO TEST DEPTH. REF B ALSO REPORTED SATISFACTORY COMPLETION OF ALL SEA TRIALS, COMPLETION OF CONTROLLED DIVES, AND CORRECTION OF MANDATORY SEA TRIAL DEFICIENCIES.

2. IAW REFS A AND C, NAVSEA CERTIFIES THAT THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY AND NO OUTSTANDING DEPTH LIMITING DISCREPANCIES EXIST.

3. SUBJECT TO CONFIRMATION BY TYCOM THAT REF A CERTIFICATION REQUIREMENTS HAVE BEEN SUSTAINED FOR THE REMAINDER OF THE SUBSAFE CERTIFICATION BOUNDARY AND, IAW REF A AND C, NAVSEA RECOMMENDS THAT USS <*SHIP NAME/HULL NO.*> BE AUTHORIZED UNRESTRICTED OPERATIONS TO TEST DEPTH SUBJECT TO COMPLIANCE WITH REF A <*WITH THE FOLLOWING RESTRICTIONS: list any restrictions which may be applicable*>.

4. URO/MRC PERIODICITIES REQUIRED BY REF A SHALL COMMENCE ON <*DATE*>.

B.3.10. TYCOM AUTHORIZATION FOR URO SAMPLE MESSAGE.

[5.6.2.3.e] From TYCOM to Ship Concerning URO

FROM: COMSUB<*LANT/PAC*><*NORFOLK VA/PEARL HARBOR HI*>//

TO: USS <*SHIP NAME*>//

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
CINC<*LANT/PAC*>FLT<*NORFOLK VA/PEARL HARBOR HI*>
<*DIRSSP WASHINGTON DC FOR SSBN*>
COMSUBGRU <*NO.*>
COMSUBRON <*NO.*>
<*SUPERVISING AUTHORITY*>

UNCLAS // N09094 //

MSGID/GENADMIN/COMSUB<*LANT/PAC*>//

SUBJ/(SUBS) UNRESTRICTED OPERATION OF USS <*SHIP NAME/HULL NO.*>//

REF/A/MSG/COMNAVSEASYSCOM/<*DTG*>// {B.3.9}
REF/B/DOC/NAVSEA 0924-062-0010//
REF/C/DOC/COMSUB<*LANT/PAC*>NOTE C3120//

NARR/REF A IS NAVSEA URO MSG FOR USS <*SHIP NAME/HULL NO.*>. REF B IS THE SUBSAFE REQUIREMENTS MANUAL. REF C CONTAINS TYCOM AUTHORIZED SUBMARINE OPERATING AND TEST DEPTHS.//

RMKS/1. REF A CERTIFIED THE SUBSAFE MATERIAL CONDITION OF THOSE PARTS OF USS <*SHIP NAME/HULL NO.*> INSTALLED, REPAIRED, AND/OR TESTED BY THE SHIPYARD IS SATISFACTORY AND RECOMMENDED THAT USS <*SHIP NAME/HULL NO.*> BE AUTHORIZED TO CONDUCT UNRESTRICTED OPERATIONS TO TEST DEPTH.

2. <*TYCOM*> CONFIRMS THAT CERTIFICATION OF THE REMAINDER OF ITEMS NOT COVERED BY REF A WITHIN THE SUBSAFE CERTIFICATION BOUNDARY HAS BEEN SUSTAINED. ACCORDINGLY, USS <*SHIP NAME/HULL NO.*> IS AUTHORIZED TO CONDUCT OPERATIONS TO <*SPECIFIED*> DEPTH, SUBJECT TO THE FOLLOWING RESTRICTIONS: <*list restrictions if they exist or state "NONE"*>.

3. CONTINUED CERTIFICATION FOR OPERATIONS TO TEST DEPTH IS SUBJECT TO COMPLIANCE WITH REF B. URO/MRC PERIODICITIES COMMENCE ON <*DATE*>.

4. THIS MSG REMAINS IN EFFECT UNTIL INCLUDED IN A FUTURE REVISION OF REF C.//

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SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

APPENDIX C

DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

SSG 71

C.1 GENERAL.

Appendix C provides examples of OQE necessary to assure compliance with contractually invoked SUBSAFE tests and inspections and should be used as a guide for provisioning deliverable data. All documentation required by standards and specifications should be obtained. If specifications provide an option for ordering documentation, the shipbuilder or maintenance activity shall obtain the OQE listed in Appendix C when ordering the material. Appendix C is not intended to be an all inclusive list of required OQE. The Design Yard will develop a class SUBSAFE Certification Audit Plan (SSCAP) as specified in paragraph 4.6.9.2.

C.2 RESOLUTION OF ITEMS NOT COMPLETE AT THE TIME OF THE NAVSEA SUBSAFE AUDIT.

At the time of the NAVSEA SUBSAFE audit, completion of all requirements will not have occurred (e.g., incomplete work/testing); or the time frame for accomplishing a requirement is subsequent to the audit. The actions necessary for satisfactory accomplishment of these items, which are identified below, will be certified by the Shipbuilder prior to SUPSHIP sending its SUBSAFE Certification Message to NAVSEA stating that the material condition of those areas of the ship is satisfactory in accordance with this manual. The actual status at the time of the audit of each item shown below will be included in the "Discussion" paragraph of the applicable certification item audit card:

a. Completion of all SUBSAFE testing, Salvage Inspection, and Access To Vital Equipment requirements (See parts III.A. and III.C.).

b. NAVSEA approval of the Sea Trial Agenda, At-Sea EMBT Blow, and At-Sea (Deep Dive) Test Procedure (See parts III.A., and III.B.).

c. Certification of the SDI, SSM and SEPM, SRD, and the SSCB Book accuracy and delivery of annotated copies to ship's force (See parts IV.A. and IV.E.).

d. Resolution of all deviations and waivers (See part IV.B.2.).

e. Submission of the first update of the SSDR report to NAVSEA (See part IV.C.).

f. Completion of all SUBSAFE work and REC requirements (See parts V.A.2. and V.B.3.).

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

NOTE: 1. All items within the SUBSAFE Boundary require "system certification" as defined in Paragraph 4.2.4.

2. Where Hull Integrity is indicated as a requirement, 100% verification is required for the respective OQE.

3. Though not marked, Sections 3.4 and 4.6.7 are applicable throughout.

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TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

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I. MATERIAL CONDITION - STRUCTURE

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. STRUCTURAL PLATES	4.6.3	1. NDT- VT, MT, UT	Records required by Section 5 of NAVSEA T9074-AD-GIB-010/1688 or ship/equipment drawings.	X
		2. VM	Records of satisfactory chemical and mechanical properties of an item of material required by Section 5 of NAVSEA T9074-AD-GIB-010/1688.	X
B. CASTINGS	4.6.3	1. NDT- VT, MT, UT, RT, PT	Records required by Section 5 of NAVSEA T9074-AD-GIB-010/1688 or ship/equipment drawings.	X
		2. VM	Records of satisfactory chemical and mechanical properties of an item of material required by Section 5 of NAVSEA T9074-AD-GIB-010/1688, or Section 3 of NAVSEA 0948-LP-045-7010.	X
C. WROUGHT MATERIAL (FORGED, EXTRUDED, DRAWN, ROLLED)	4.6.3	1. NDT- VT, MT, UT, PT	Records required by Section 5 of NAVSEA T9074-AD-GIB-010/1688 or ship/equipment drawings.	X
		2. VM	Records of satisfactory chemical and mechanical properties of an item of material required by Section 5 of NAVSEA T9074-AD-GIB-010/1688, or Section 3 of NAVSEA 0948-LP-045-7010 for other materials.	X

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

I. MATERIAL CONDITION - STRUCTURE (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
D. STRUCTURAL WELDS (FULL AND PARTIAL PENETRATION WELDS)	4.6.3	1. NDT- VT, MT, RT, UT, PT	Records required by Section 5 of NAVSEA T9074-AD-GIB-010/1688 or NAVSEA S9074-AR-GIB-010/278 for other materials.	X
		2. Joint fitup and preparation-clearance, align-ment, joint type, preparation, and cleanliness.	Records required by Section 5 of NAVSEA T9074-AD-GIB-010/1688.	NA
		3. Welding Qualifications.	Records equivalent to that required by Section 5 of NAVSEA T9074-AD-GIB-010/1688 which provide evidence of control that approved welding procedures were utilized and that welders were qualified.	NA
		4. Electrodes.	Records equivalent to that required by Section 10 of NAVSEA T9074-AD-GIB-010/1688 which provide evidence of control of electrode type.	NA
E. NDT QUALIFICATIONS 1. Personnel	4.6.3	All operators qualified.	Records equivalent to that required by Section 4 of NAVSEA T9074-AD-GIB-010/1688 which provide evidence of control of personnel qualification.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

I. MATERIAL CONDITION - STRUCTURE (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
E. NDT QUALIFICATIONS (Cont'd)				
2. Equipment	4.6.3	Equipment qualified by demonstrated capability and periodic calibration.	Records which reflect the qualification and calibration of NDT equipment.	NA
3. Procedures		Procedures which govern the NDT operations.	NDT procedures equivalent to that required by Section 4 of NAVSEA T9074-AD-GIB-010/1688.	NA
F. MATERIAL FORMING				
1. Hot Formed	4.6.3	a. NDT- MT, RT, UT	For MT, a log or similar record of acceptance equivalent to that required by Section 9 of NAVSEA T9074-AD-GIB-010/1688. For other NDT, records required by Section 5 or 9 of NAVSEA T9074-AD-GIB-010/1688.	NA
		b. Mechanical Properties Testing and Surface Inspection.	Records required by Section 5 or 9 of NAVSEA T9074-AD-GIB-010/1688.	NA
2. Cold Formed		NDT- MT, PT	A log or similar record of MT acceptance equivalent to that required by Section 9 of NAVSEA T9074-AD-GIB-010/1688.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

I. MATERIAL CONDITION - STRUCTURE (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
G. DIMENSIONAL CONTROL Frames	4.6.3	Pressure hull, Bridge Access Trunk and hard tank frames - spacing, depth, web tilt, flange width, flange tilt, and flange unbalance.	Records equivalent to that required by Section 12 of NAVSEA T9074-AD-GIB-010/1688.	NA
H. HULL CIRCULARITY AND HULL FAIRNESS	4.6.3	1. Written procedures covering all processes.	NAVSEA approved measurement method.	NA
		2. The trace of the actual contour shall not deviate from the mean circle by more than ½ the thickness of the pressure hull plating or ½ inch, whichever is less; the radius of the mean circle shall not depart from the design radius by more than ½ the thickness of the pressure hull plating or ½ inch, whichever is less. Hull fairness measurements less than or equal to the specified maximum for all pressure hull plating.	Records equivalent to that required by Section 12 of NAVSEA T9074-AD-GIB-010/1688.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

I. MATERIAL CONDITION - STRUCTURE (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
I. MAINTENANCE PROGRAM (URO/MRC)	6.4	Completion of all applicable URO/MRC requirements within the specified periodicity (*Applicable to all availabilities subsequent to new construction delivery*). 1. MRC-001 - Perform NDT Surveillance of Hull Welds. 2. MRC-002 - Inspect Stern Tube. 3. MRC-003 - Conduct Hull Structural Survey. 4. MRC-004 - Perform UT Sampling of Hull Welds. 5. MRC-005 - UT Inspect Hull Welds With Known Discontinuities 6. MRC-035 - Inspect Tubes and Cylinders Through Pressure Hull.	Copy of satisfactorily completed MRC, documentation of submittal to NAVSEA (when required), and the Shipyard document that implements the MRC.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

II. MATERIAL CONDITION - PIPING AND COMPONENTS

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. PIPE AND TUBING	4.6.4	1. NDT- UT	Records of satisfactory inspection required by piping/tubing specifications.	X
		2. VM	Records of satisfactory chemical and mechanical properties of an item of material required by Section 3 of NAVSEA 0948-LP-045-7010.	X
B. CASTINGS	4.6.4.4	1. NDT- VT, MT, UT, RT, PT	Records required by NAVSEA S9074-AR-GIB-010/278 or ship/equipment drawings.	X
		2. VM	Records of satisfactory chemical and mechanical properties of an item of material required by Section 3 of NAVSEA 0948-LP-045-7010.	X
C. WROUGHT MATERIAL (FORGED, EXTRUDED, DRAWN, ROLLED)	4.6.4.5	1. NDT- MT, UT, PT	Records required by the material specifications or ship/equipment drawings.	X
		2. VM	Records of satisfactory chemical and mechanical properties of an item of material required by Section 3 of NAVSEA 0948-LP-045-7010.	X
D. PIPE AND COMPONENT WELDS	4.6.4.1	1. NDT- VT, MT, RT, UT, PT	Records required by NAVSEA S9074-AR-GIB-010/278.	X
		2. Joint fitup and preparation- clearance, alignment, joint type, preparation, and cleanliness.	Records equivalent to that required by NAVSEA S9074-AR-GIB-010/278.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

II. MATERIAL CONDITION - PIPING AND COMPONENTS (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
D. PIPE AND COMPONENT WELDS (Cont'd)	4.6.4.1	3. Welding Qualifications.	Records required by NAVSEA S9074-AR-GIB-010/278 that verify approved welding procedures were utilized and that welders were qualified.	NA
		4. Electrodes	Records of material type required by NAVSEA S9074-AR-GIB-010/278.	NA
E. NDT QUALIFICATIONS 1. Personnel	4.6.4	All operators qualified.	Records equivalent to those required by Section 1 of NAVSEA T9074-AS-GIB-010/271.	NA
2. Equipment		Equipment qualified by demonstrated capability and periodic calibration.	Records which reflect the qualification and calibration of NDT equipment.	NA
3. Procedures		Procedures which govern the NDT operations.	NDT procedures equivalent to that required by Section 1 of NAVSEA T9074-AS-GIB-010/271.	NA
F. FASTENERS AND MECHANICAL JOINTS 1. Hull Integrity Fasteners	4.6.5	a. Visual Inspection (VT) of reused fasteners.	(1) Male Threaded: Post-installation verification of material ID (e.g., "·K·" for NICUAL, "T7" for Titanium), lot number marking and manufacturer's symbol.	X
		b. VM	(1) Male Threaded: Records of the chemical and mechanical properties of an item of material required by the applicable fastener specification and NAVSEA 0948-LP-045-7010.	X

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

II. MATERIAL CONDITION - PIPING AND COMPONENTS (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL NTEGRITY
F. FASTENERS AND MECHANICAL JOINTS (Cont'd)				
2. Mechanical Joints	4.6.4	As specified in Section 4.6.4.2, Torque (TQ)	Records required by Section 4.6.4.2 of NAVSEA 0924-062-0010.	X
G. MAINTENANCE PROGRAM (URO/MRC)	6.4	Completion of applicable URO/MRC requirements within the specified periodicity (*Applicable to all availabilities subsequent to new construction delivery*).	Copy of satisfactorily completed MRC, documentation of submittal to NAVSEA (when required), and shipyard document that implements the MRC.	NA
		1. MRC-006 - Inspect Seawater Pump Casing Wall Thickness.		
		2. MRC-008 - Inspect Hull and Backup Valves.		NA
		3. MRC-009 - Inspect Ball Valve Stems.		NA
		4. MRC-013 - Inspect Seawater Piping Systems.		NA
		5. MRC-028 - Inspect Shaft Seal Housing.		NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

III. MATERIAL CONDITION - TESTING

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. TEST PERFORMANCE 1. Emergency Main Ballast Tank (EMBT) Blow System	4.4.2.3	a. Completion of dockside testing.	Records of satisfactory completion of a Government approved Test Procedure.	NA
		b. Completion of at-sea testing.	Test Procedure submitted to NAVSEA for approval (*NAVSEA approval of the Test Procedure prior to fast Cruise and satisfactory completion of at-sea testing is reported as stated in Section C.2*).	NA
2. Emergency Flood Control Hydraulic System	4.5.1.4	Completion of testing.	Records of satisfactory completion of a Government approved Test Procedure.	NA
3. Stern Diving Plane System	4.5.2.3.1	Completion of testing.	Records of satisfactory completion of a Government approved Test Procedure.	NA
4. Sea-Connected, and Miscellaneous Systems and Components Other Than Those Listed Above	4.6.8	a. Completion of testing.	Records of satisfactory completion of testing (*completion of testing prior to Fast Cruise is reported as stated in Section C.2*).	NA
		b. Completion of at-sea testing.	Test Procedure, which includes required at-sea testing, submitted to NAVSEA for approval (*NAVSEA approval of the Test Procedure prior to Fast Cruise and satisfactory completion of at-sea testing is reported as stated in Section C.2*).	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

III. MATERIAL CONDITION - TESTING (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. TEST PERFORMANCE (Cont'd) 5. Damage Control-Salvage Inspection	4.6.8.6	Completion of official Salvage Inspection and correction of all discrepancies.	Records which indicate that the Salvage Inspection has been scheduled (*completion of Salvage Inspection prior to Fast Cruise is reported as stated in Section C.2*).	NA
6. Access To Vital Equipment	4.6.8.4	Completion of Testing no earlier than 30 days prior to Fast Cruise and correction of all discrepancies.	Records which indicate that Access To Vital Equipment has been scheduled (*completion of Access To Vital Equipment prior to Fast Cruise is reported as stated in Section C.2*).	NA
B. SEA TRIAL AGENDA	5.6	Sea Trial Agenda submitted to NAVSEA for approval.	Submittal letter of the Agenda to NAVSEA (*NAVSEA approval of the Agenda prior to Fast Cruise is reported as stated in Section C.2*).	NA
C. MAINTENANCE PROGRAM (URO/MRC)	6.4	Completion of all applicable URO/MRC requirements within the specified periodicity (*Applicable to all availabilities subsequent to new construction delivery*).	Copy of satisfactorily completed MRC, documentation of submittal to NAVSEA (when required), and the shipyard document that implements the MRC.	NA
		1. MRC-15 - Inspect Steering and Diving Gear.		NA
		2. MRC-016 - Inspect Stern Diving Gear Control Internal Linkage and Conduct Dockside Operational Test of Stern Diving Plane System (SSN 688 and SSBN 726 Classes Only).		NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

III. MATERIAL CONDITION - TESTING (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
C. MAINTENANCE PROGRAM (URO/MRC) (Cont'd)	6.4	3. MRC-19 - Conduct Dockside Operational Test of Stern Diving Plane System (Not applicable to SSN 688 and SSBN 726 Classes).	Copy of satisfactorily completed MRC, documentation of submittal to NAVSEA (when required), and the shipyard document that implements the MRC.	NA
		4. MRC-022 - Operational and Tightness Test EMBT Blow System Valves.	(*Completion of required at-sea testing is reported as stated in Section C.2*).	NA
		5. MRC-025 - Conduct Operational Test of the Emergency Flood Closure Hydraulic System.	Copy of satisfactorily completed MRC, documentation of submittal to NAVSEA (when required), and the shipyard document that implements the MRC.	NA
		6. MRC-026 - Test Flood Control Accumulator, Air Flask, and Isolation Check Valves.		NA
		7. MRC-029 - Confirm Adequacy of Access To Vital Equipment.	Copy of satisfactorily completed MRC (no earlier than 30 days prior to Fast Cruise) and the Shipyard document that implements the MRC (*completion of required testing prior to Fast Cruise is reported as stated in Section C.2*).	NA
		8. MRC-036 - Verify that Submerged Operating Envelope Documentation is current.	Copy of the satisfactorily completed MRC, documentation of submittal to NAVSEA (when required), and the shipyard document that implements the MRC.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

IV. CONFIGURATION MANAGEMENT

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. AS-BUILT CONDITION 1. Drawing Revisions	4.6.9.3	a. An auditable system for updating the SDI which identifies work authorized and work completed.	Identification of changes to the SDI.	NA
		b. A system for reviewing and technically evaluating the differences between the work actually completed versus the work required by the latest accepted revision of the drawing, including any supplementary documents which identify SUBSAFE mandatory changes.	Records of satisfactory accomplishment of the required evaluation.	NA
		c. Provide an annotated copy of the SDI to ship's force prior to Fast Cruise.	(*Delivery of SDI prior to Fast Cruise is reported as stated in Section C.2.*)	NA
2. Verification a. Emergency Main Ballast Tank (EMBT) Blow System		System installed in accordance with approved Non-Deviational drawings (ship's installation drawings).	Records supporting that the ship configuration is the same as the drawing and any authorized modification.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

IV. CONFIGURATION MANAGEMENT (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. AS-BUILT CONDITION (Cont'd)				
b. Emergency Flood Control Hydraulic System	4.6.9.3	System installed in accordance with approved Non-Deviational drawings (ship's installation drawings).	Records supporting that the ship configuration is the same as the drawing and any authorized modification.	NA
c. Stern Diving Plane System				NA
d. Hull Integrity, Sea-Connected and Miscellaneous Systems and Components Other Than Those Listed Above				NA
e. Design Review Piping System Hangers/ Supports and Equipment Foundations	4.6.1	Piping hangers, supports, and equipment foundations within the Design Review Piping Flexibility Boundary installed in accordance with approved drawings.		NA
B. DEPARTURES FROM SPECIFICATION	3.4	1. Accountability of documents requesting a departure from specification (e.g. deviations, waivers, type "A" and "B" vendor exceptions).	Log that identifies the approval and resolution status of departures from specifications.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

IV. CONFIGURATION MANAGEMENT (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
B. DEPARTURES FROM SPECIFICATION (Cont'd)	3.4	2. Resolution of departures.	Records that support satisfactory resolution of departures (*satisfactory resolution of outstanding departures prior to Fast Cruise is reported as stated in Section C.2*).	NA
C. SUBSAFE DESIGN REVIEW	4.6.1	Design review performed and submitted to NAVSEA in accordance with NAVSEA 0941-LP-041-3010.	Records that reflect reportable differences between the class SSDR report and the as-built configuration were identified (*submittal of the updated report prior to Fast Cruise is reported as stated in Section C.2*).	NA
D. GOVERNMENT FURNISHED MATERIAL (GFM)	4.6.12	a. Identification of all GFM which is within the SUBSAFE boundary.	A list in the format approved by NAVSEA (prepared by the applicable Design Yard and provided to the Shipbuilder for additions/deletions) of SUBSAFE GFM requiring certification which identifies each item including the serial number/trace code of that material installed in the ship.	NA
		b. Shipbuilder receipt inspection to verify that GFM within the SUBSAFE boundary has been certified for SUBSAFE application.	A certification statement which verifies the adequacy of the supplied GFM.	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

IV. CONFIGURATION MANAGEMENT (CONT'D)

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
E. SHIP SELECTED RECORDS 1. Ship System Manual (SSM) and Steam and Electric Plant Manual (SEPM)	4.6.9.5	a. Updated selections of the SSM and SEPM reflect the as-built condition of the ship.	Records indicating that changes necessary to reflect the as-built condition of the ship have been processed or identified for processing.	NA
		b. Manuals provided to Ship's Force prior to Fast Cruise. For PSA, update and deliver revised SEPM/SSM in accordance with Class procedures.	(*Delivery of updated manuals prior to Fast Cruise is reported as stated in Section C.2.*)	NA
2. Selected Record Drawings (SRD)	4.6.9	a. Annotated SRDs that reflect the as-built condition of the ship.	Records indicating that technical changes which affect SRDs have been incorporated or identified for incorporation into the appropriate SRD.	NA
		b. SRDs provided to Ship's Force prior to Fast Cruise.	(*Delivery of annotated SRDs prior to Fast Cruise is reported as stated in Section C.2.*)	NA
3. SUBSAFE Certification Boundary (SSCB) Book	4.6.9.1	a. Updated plates of the SSCB book that reflect the as-built condition of the ship.	Records indicating that changes necessary to reflect the as-built conditions of the ship have been processed or identified for processing.	NA
		b. Design Agent approved SSCB book provided to Ship's Force prior to Fast Cruise.	(*Delivery of an updated approved manual prior to Fast Cruise is reported as stated in Section C.2.*)	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

V. WORK COMPLETION

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. WORK ACCOMPLISHMENT 1. Work Authorization	6.3.2	All required work issued for accomplishment.	Records that indicate work was issued for accomplishment or is scheduled for issue.	NA
2. Work Completion		Completion of authorized SUBSAFE work.	Procedures for identification and tracking the satisfactory completion of SUBSAFE work and records that reflect the completion status (*completion of all SUBSAFE work prior to Fast Cruise is reported as stated in Section C.2*).	NA
B. RE-ENTRY CONTROL (REC)	6.3.2	1. System for REC.	Written procedures covering the process.	NA
		2. REC log.	REC log.	NA
		3. Work performed within the SUBSAFE boundaries (after the items/systems were installed in the ship and inspected and/or tested and accepted) was planned, authorized, accomplished, inspected, tested, completed, recertified, and documented on a REC form.	Satisfactorily completed RECs with supporting documentation (*completion of all RECs prior to Fast Cruise is reported as stated in Section C.2*).	NA

TABLE C-1. DOCUMENTATION REQUIRED (OQE) FOR CERTIFICATION

VI. VERTICAL AUDIT

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. VERTICAL AUDIT	5.5.1.2	Vertical audit of selected SUBSAFE components.	Records which verify compliance with SUBSAFE requirements and satisfactory completion of work.	NA

VII. RT FILM REVIEW

ITEM TO BE CERTIFIED	SUBSAFE MANUAL	DESCRIPTION OF REQUIREMENTS	OBJECTIVE QUALITY EVIDENCE (OQE)	HULL INTEGRITY
A. RT FILM REVIEW	4.6.3 4.6.4	NDT - RT	Radiographs and supporting documentation which verify that structural welds, pipe welds, and castings conform with specification requirements.	NA

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APPENDIX D

BACKGROUND MATERIAL FOR PRE-SSN 688 CLASS

D.1 INTRODUCTION.

The following paragraphs contain background information excerpted directly from the initial Submarine Safety Certification Criterion (BUSHIPS letter serial 525-0462 of 20 December 1963) and subsequent clarification letters. This material has been included to provide the rationale on which the original SUBSAFE criterion was based. It is recognized that some of the rationale is no longer pertinent; however, this appendix does provide a historic compilation. Material included from clarification letters is identified. Only the background paragraphs of these clarification letters have been included and the original paragraph numbers have been retained.

D.2 CRITICAL PIPING SYSTEM AND HULL INTEGRITY JOINTS (PART IA).

In making permanent piping and other joints the butt weld is generally accepted as being as strong as the pipe it joins, and is, therefore, the preferred type of joint and the standard against which other types of joints are compared. Inherent in this acceptance is the fact that the butt weld can be examined radiographically to insure its soundness. Butt welds have not been used exclusively in non-ferrous piping due primarily to such considerations as fabrication time, cost, space and orientation requirements for this type joint, lack of weldable grade castings for valves and special fittings, and difficulty of burn-through in small size pipe.

Socket welds have been demonstrated to be adequate for joint fabrication in critical submarine piping systems and are permitted by MIL-STD-22A in sizes up to 2 inches ips. Socket welds suffer equally with butt welds with respect to lack of weldable grade castings and difficulty of burn-through in small size pipe. Socket welded joints cannot be radiographed with meaning; therefore, non-destructive test requirements specify a check during fabrication for weld cracking using dye penetrant techniques.

Silver brazed joints have had the advantage over butt welded joints in submarine construction due to the ease of fabrication, compatibility with available castings, and that this type of joint minimizes space requirements for piping. The principle disadvantage of the sil-braze joint has been the inability to prove the extent of bonding and hence to insure adequate joint strength. Because of this lack of a reliable inspection method, joint failures were experienced and welding was required in some critical applications. In addition, the difficulty of fabricating large, sil-braze joints and the seriousness of their failure has led to welding in large sizes. Considerable efforts were made to provide maximum piping integrity during construction by the use of improved brazing materials, improved fabrication techniques such as induction brazing, tightened production controls and stringent inspection using known techniques. The search for a reliable inspection tool has culminated in the proving of ultrasonic techniques as a dependable inspection for silver braze joint bonding.

Tests indicate that silver brazed joints having a bond of 30% or greater are as strong as the pipe and, therefore, equivalent in strength to welded joints. Further, tests show that an ultrasonic inspection reading of 60% bond gives statistical assurance that the actual joint bond is greater than 40%. Actual in-service failures have occurred only where little if any bond existed or where improper materials were used. Therefore, ultrasonic inspection of sil-braze joints to 60% bond coupled with other quality assurance controls such as material certification, brazer qualifications, etc., provide adequate assurance of joint integrity.

In view of the improved technical situation in fabrication and inspection of piping system joints by welding (butt and socket) and sil-brazing and based on the enhanced flooding control and MBT blow capability provided in Parts IIA and IIB of this certification package, the action below is set forth as the minimum requirement for certification of permanent joints in critical piping systems.

From BUSHIPS LTR C-SS/5100 Serial 525-093 of 29 January 1966.

1. The Submarine Safety Certification Criterion was promulgated in reference (a) (BUSHIPS ltr Ser 525-0462 of 20 Dec 1963). These criteria included improved non-destructive testing (NDT) requirements, replacement of suspect castings and other materials, the provision of improved flooding control and recovery capabilities, and other technical improvements. New silver-brazed pipe joint bond requirements were established and the replacement of certain previously silver-brazed piping joints with weld joints was also included. However, there were no requirements for re-radiography of existing pipe or hull welds since none of the investigations following the loss of the THRESHER and the resulting recommendations have indicated a need to re-inspect existing welds in sea-connected system components or the hull. Years of operation without any indications of catastrophic failures due to defective welds; ductility of the materials involved; and non-destructive tests utilized at the time of fabrication provide a strong basis for confidence in existing hull and component welds. The absence of serious weld failures following severe wartime punishment of hulls fabricated of materials inferior to those used in post war submarines and welded without benefit of radiography provides additional confidence in the welding process. When concern is warranted, as was the case in NAUTILUS hull cracks and SKIPJACK shielding attachment, suitable inspection and corrective programs have been and will continue to be invoked to provide greater assurance in the integrity of the submarine structure.

2. Without any evidence to indicate that gross defects did exist in seawater piping but with some question as to the actual condition of joints in the large relatively thin walled piping in seawater systems, especially the MSW System, reference (b) and later Change 19 to reference (a) were issued. This Change, which applies to all butt welds in seawater piping (but not to components or pressure hull welds) open to sea below 200 feet submergence during any normal mode of operation, reads in part as follows:

> Existing butt welds in seawater system piping need not be replaced or re-radiographed provided original specifications, plans, purchase specifications or other documents required radiography for the weld in question. A written statement by the SUPSHIP, INDMAN, or SHIPYARD

> COMMANDER that record evidence is available that radiography was accomplished to the then existing standards will suffice for certification. Original RT records need not be produced. An appropriate notation of compliance with the above shall be made in the certification records. Where radiography was not accomplished to the satisfaction of (the) above, it shall be performed and current acceptance standards will be used to evaluate defects.

Components and pressure hull welds were specifically not included in the above because, in general for submarines being certified to reference (a):

a. Non-destructive tests considered appropriate at the time of fabrication were required when the hull or component was fabricated including radiography of all hull butt welds.

b. The materials involved are ductile and not prone to catastrophic failure.

c. Welded joints have a long history of satisfactory service.

D.3 FLEXIBLE CONNECTIONS (PART IB).

a. The resilient mounting of machinery for noise attenuation requires that flexible connections be used for transferring a fluid from the machinery to the fixed piping. Two principal types of devices are now in use: (1) the flexible hose connections and, (2) the "EB type" captive rubber flexible joint.

b. The flexible hose type connection consists of hose of sufficient length and arrangement to accommodate the required shock and vibration motions. The service history of flexible hose type connections indicates that they are subject to catastrophic types of failure. Failure can be due to corrosion, use of improper hose or end fittings, misalignment and poor workmanship during assembly of the hose and end fittings or during installation of the hose in the piping system. Extreme care must, therefore, be used in the selection, assembly and installation of the hose type connection.

c. The "EB type" joints provide for noise attenuation and flexibility but have captive rubber donuts so that risk of catastrophic failure is minimized. Service history of this joint indicates that failure results only in minor leakage and is almost always due to improper installation which places unusual loads on the flexible portion of the joint. From an installation standpoint, when compared to the hose type joint, the "EB type" joint has less flexibility per unit of length and requires more space for installation.

D.4 CASTINGS (PART IC).

a. Compared to more recent submarines, relatively little radiographic inspection of pressure containing castings in seawater systems was performed in earlier submarines. Castings which were radiographed during past years would probably be unacceptable to present standards and requirements in view of the high rejection rate experienced when the requirements of radiographic inspection of castings now being installed in new construction submarines were

first increased in scope. Due to the continuing requirements for high quality castings for submarine service, industry has improved its casting methods and procedures to the extent that sound castings are now being produced with a significant reduction in the rate of rejection.

b. Although there is no history of serious casting failures in service, it is possible that serious defects exist in castings which could cause failure and result in flooding. In addition, the level of confidence in the ability of a casting to resist shock and failure from fatigue greatly increases with the soundness of the casting.

D.5 ALUMINUM-BRONZE (PART ID).

a. Aluminum-bronze is a strong, easily cast material that early tests showed to have a good seawater corrosion resistance. It was used in submarines to a small extent subsequent to 1955 and to a much greater extent after 1960. Recent tests have disclosed that certain forms of aluminum-bronze corrode in seawater due to intergranular corrosion (dealuminization), thereby losing strength and ductility. The extent of corrosion is time dependent and cannot be detected by any known non-destructive tests. Certain types of aluminum-bronze exhibit the dealuminization phenomenon to a greater extent than others and some types have shown good resistance to corrosion. In certain installations, even the types showing rapid dealuminization in test do not deteriorate in service, i.e., propellers.

b. Material manufactured to the specifications noted in Tables I and II below and in contact with seawater are unsatisfactory and must be replaced. Table I represents those aluminum-bronzes, of essentially the same chemistry, which have dealuminized most severely in a relatively short time. Table II lists those specifications that have been used to produce material which when exposed to seawater will undergo dealuminization to a lesser degree than those in Table I.

TABLE I	TABLE II
MIL-B-16033, C1 1 & 2	MIL-B-16033, C1 3 & 4
ASTM-B-148, Alloys 9A & 9B	MIL-B-21230, Alloy 1 (Less than 4% Ni)
QQ-B-671, C1 1 & 2	ASTM-B-148, Alloys 9C & 9D
MIL-B-16166, Type 1	QQ-B-671, C1 3 & 4
QQ-B-679, Comp 1, 3 & 5	MIL-C-15345F, Alloy 13, 14 & 15

c. Replacement of components manufactured of material cited in Tables I and II above should be in accordance with the following requirements:

(1) MIL-B-21230, Alloy 1 (Minimum 4% Ni)

(2) MIL-B-23921 of 20 Nov 63

(3) (MOD I) MIL-B-24059 (Ships) of 15 APR 64 (For wrought material)

d. (MOD I) Exceptions due to Environment: Components made of aluminum-bronze lacking the 4% minimum nickel content may, because of environment, be afforded sufficient cathodic protection to resist intergranular attack when in contact with seawater.

As noted in the case of submarine propellers made of an aluminum-bronze lacking sufficient nickel content, a large galvanic couple is set up between the steel hull (with attached zinc anodes) and the propeller. The steel and/or zinc are anodic to the propeller and inhibit corrosion of the latter part. In other areas such as in way of inner and outer torpedo tube attachments and castings external to the hull, environmental conditions similar to those in way of the submarine propeller may inhibit corrosion of aluminum-bronze material without benefit of significant nickel content. This has been verified on torpedo tube appurtenances of operating submarines (TRIGGER and SEADRAGON), by actual tests. The test applicable is set forth below.

From BUSHIPS LTR 5100 Serial 525-397 of 21 March 1966.

2. The replacement of unsatisfactory aluminum-bronze in contact with seawater, including components on the torpedo tubes, is based on loss of strength and ductility through dealuminization that could result in failure of the component thereby causing flooding or result in degradation of operational capability. Due to the gradations in the possibility of failure and the consequences of the failure, some aluminum-bronze components require mandatory action and others require action on an NDV basis. Examination of numerous torpedo tube aluminum-bronze components removed for certification and a review of the function of the many components in the tubes, permits a more definitive statement as to which of the "NDV type" components should be replaced.

From NAVSEC LTR 10310 Serial 6634B-676 of 25 July 1966.

2. Laboratory investigations have indicated that a temper anneal at 1250^{o} F to 1350^{o} F for 3 hours at temperature, followed by either a furnace cool or an air cool, improves the dealuminization resistance of the subject base materials. A similar post weld temper of weldments improves the dealuminization resistance of the heat affected zone. The cooling rate from the tempering temperature, although not a major factor with respect to corrosion resistance, is important with respect to minimizing thermal stresses in complex castings.

D.6 FASTENERS (PART IE).

Ref: (a) BUSHIPS ltr SS9480 Ser 648K-1320 of 26 Oct 62
(b) SUPSHIP NPTNWS Msg 131950Z Feb 63
(c) BUSHIPS Msg 152040Z May 63
(d) BUSHIPS Msg 221841Z May 63
(e) BUSHIPS Msg 061638Z Jun 63
(f) BUSHIPS ltr Ser 525-2231 of 18 Nov 63
(g) BUSHIPS Msg 061551Z Nov 63

1. BACKGROUND

Submarine shock test results and tests conducted at MEL demonstrated that monel fasteners in hull integrity joints constituted a weak link in submarine shock resistance since these fasteners yielded under relatively low explosive loadings. Reference (a) recommended that to shock harden hull integrity closures, monel fasteners should be replaced with age hardened K-Monel

fasteners when the hull integrity closures underwent repair, renewal, or were being disturbed for any other reason. Reference (b) noted that lack of proper quality control procedures coupled with poor manufacturing techniques allowed an unknown number of brittle (less than 15% elongation) K-Monel fasteners to be installed in some new construction submarines. Brittle fasteners may have very high strength but would be expected to fail under shock loading. Shortly after being notified of the brittle K-Monel fastener situation, the Bureau, by reference (c) and (d), alerted all activities to this situation and requested them to sample certain fasteners both installed and in stock. In addition, activities were requested to review and submit to the Bureau their current quality control programs with any recommendations for strengthening same. Following references (c) and (d) the Bureau sent out reference (e) which requested that the scope of the sampling program be expanded as necessary to cover fully all suspected fasteners. During this period, the Bureau initiated the development of a non-destructive test method for detecting the existence of brittle K-Monel material. To date, a satisfactory means for non-destructively indicating the ductility of K-Monel is not available. However, as a result of the investigation, a chemical spot test procedure has been developed which will distinguish nickel-base alloys from other material and differentiate monel from K-Monel. Both of these tests have been made available to all activities by reference (f). Reports submitted to the Bureau as a result of reference (c), (d), and (e) indicate that the installation of brittle fasteners appears to have been confined to one shipbuilder. However, these reports have uncovered an additional problem of a general intermixing of monel, age hardened K-Monel, non-age hardened K-Monel and steel fasteners.

Reference (g) outlined an interim program for replacement or retention of non reactor plant hull integrity age hardened K-Monel fasteners in submarines under construction.

D.7 DESIGN REVIEW (PART IF).

Ref: (a) BUSHIPS ltr Ser 1500D-01011 of 30 Aug 63
(b) BUSHIPS ltr Ser 525-0325 of 20 Sep 63
(c) BUSHIPS ltr Ser 525-0416 of 19 Nov 63

1. BACKGROUND

Although submarine design has always been strongly oriented toward safety, particularly in regard to the integrity of the sea resisting envelope, a review of the design of all deep diving submarines will be conducted to insure that the hull boundary, including pressurized seawater systems, is adequate in light of today's standards. All critical fittings which exclude seawater from within the hull and seawater systems including their components will be identified and determined adequate for their intended service throughout the life of the ship. The design, material, fabrication, and test requirements will be certified. BUSHIPS will review the adequacy of the hull design.

2. PURPOSE

To certify the adequacy of the hull boundary and seawater systems in design, materials, fabrication, and testing.

3. ACTION

a. Reactor plant seawater systems

The following action has been directed by reference (a) for all reactor plant seawater systems:

(1) Ensure that all seawater systems and components associated with the reactor plant are adequate for their intended service throughout the life of the ship. As part of this program, it will be necessary to identify any highly stressed areas in piping or components and to determine whether proper materials and fabrication techniques have been used in the construction of these components.

(2) Electric Boat Division is taking the following action to accomplish the objectives of paragraph (1) above:

(a) Preparing a comprehensive list of all reactor plant components and equipment in reactor plant seawater systems to ensure that subsequent component reviews cover all items. This list will include identification of the types of specifications and quantities of all pipe, fittings, valves, and instruments used in these systems as well as major components such as heat exchangers, pumps, and condensers.

(b) Reviewing all reactor plant seawater piping systems to determine whether highly stressed areas exist in the piping or at the component attachments.

(c) Calculating nozzle reactions for all heat exchangers, condensers, and pumps from the list of paragraph (2)(a) above.

(3) In addition, EB Division is reviewing all components from the list in paragraph (2)(a) above in order to identify improper materials or construction techniques in the original design or inadequate inspections during fabrication. EB Division is also preparing procedures, including appropriate technical manual changes, for inspection of installed components for corrosion, erosion, correct material, and the presence of material defects.

b. Critical fittings subject to submergence pressure and seawater systems other than reactor plant:

(1) The designated design agent shall conduct an investigation of the design of all critical fittings which exclude seawater from within the hull and seawater systems open to sea below 200 ft submergence depth during any normal mode of operation, except those components and piping systems 3-1/2 inches ips and less which are inboard of the inboard flange of the back-up valve, with the aim of certifying their strength for operation to test depth for the life of the ship. It will be necessary to identify all critical fittings and all parts of seawater systems, the environment as it affects the life of the component, and design and test history of each. References (b) and (c) directed Portsmouth Naval Shipyard to conduct this study for the SSN 593 Class. It emphasized that this investigation is directed toward certifying only the strength and such features as relate to system safety, and

should not include review of normal functional or operating features. This includes the following:

(a) To insure that a plan exists showing every item penetrating structures, which may be subject to submergence pressure, such as mechanical, electrical, electronic, and structural items. Generate a diagram for each seawater system showing every item installed. The pressure hull will be reviewed by NAVSHIPS but sea chests and inserts are a part of this investigation.

(b) To consider for each item (including pipe) its material, shape, strength, support installation, etc., and the environment of force, moment, temperature, pressure, etc., as the item's functions are affected. Determine if material and other specifications insure proper items with no unsatisfactory alternative (this includes MIL specs referenced). Review also all fabrication, assembly, type and production test, non-destructive test and other inspection requirements for adequacy. Review or redo the engineering calculations necessary to insure that the basic design is adequate or propose modifications or new components which would be satisfactory. If areas are in question due to lack of knowledge of environment or displacements, etc., or if additional tests are deemed advisable, propose a test program including detailed requirements.

(c) Piping flexibility calculations will be required for the following piping systems or portions thereof open to sea below 200 ft submergence depth during any normal mode of operation. The calculations shall determine if the system has adequate flexibility.

1) Main Sea Water System.

2) Emergency Main Ballast Tank Blow System.

3) Other seawater systems 4 inches ips and larger including branch lines 2 inches ips and larger. The branch lines shall be analyzed to the first anchor or the second hanger on the branch line, whichever is first.

4) All seawater systems or portions of in sizes 1/2 inch ips to 3-1/2 inches ips inclusive from the hull attachment inboard to inboard flange of the back-up valve where separated by piping. In cases where the back-up valve is not an anchor the analysis shall be taken to the first anchor or second hanger inboard of the back-up valve, whichever is first.

(d) Where items of contractor furnished equipment are involved, documentation must support the design. Each shipyard shall certify that all test reports and requirements therefore are adequate. If results are not complete, institute completion action.

(e) Where items of government furnished equipment are concerned, the environment as it affects the unit shall be submitted so that NAVSHIPS may review the detail in design of the component and insure inclusion of these details in NAVSHIPS plans for testing.

(2) Where follow yards have deviated from lead yard plans in any detail regarding these vital items, similar supporting engineering analysis

must be presented to insure satisfactory service of the submarines involved. It is the responsibility of each Supervisor of Shipbuilding to insure that these studies are made and presented to NAVSHIPS on the same schedule as the design lead yard.

(3) As each area is cleared for basic design, compliance with requirements shall be documented for each ship and any discrepancies corrected and/or reported to NAVSHIPS immediately for resolution.

(4) The report of this design investigation, compliance for each ship, documentation of details and the accomplishment of any corrections found necessary will form a part of the certification for the Submarine Safety Program which is one prerequisite for clearing the ships for the return to operations at test depth.

From NAVSHIPS LTR 9020 Serial 2896-PMS381 of 28 July 1971.

NOTE

This letter, in response to a request from COMSUBLANT for additional guidance regarding design review requirements for changes made by Forces Afloat, provided the following information to the Submarine Type Commanders.

SCOPE OF DESIGN REVIEW BOUNDARIES

A. The following shall be Design Reviewed.

1. Hull and Hull Penetrations

2. Sea-connected system components located between the hull closure and the inboard flange of the back-up valve, which are 1/2 inch ips and larger.

3. Sea-connected system components, inboard of the inboard flange of the back-up valve, which are 4 inches ips and larger in systems open below 200 feet in any normal mode of operation.

4. Sea-connected piping between hull and inboard flange of the back-up valve, which are 1/2 inch and larger, when flexibility of the system is affected.

5. Sea-connected piping systems inboard of the inboard flange of the back-up valve which are 4 inches ips and larger, including all 2 inches ips and larger branch lines connected thereto. Branch lines are included to enable assessment of their effects on the attached header, when flexibility of the system is affected.

B. Definitions

1. Sea-connected piping systems - This includes all seawater systems and any other system or portion thereof which are normally exposed to sea pressure below 200 ft submergence depth.

2. System - As used herein, the system shall refer to all components located between machinery and/or hull terminals that require flexibility analyses or evaluation to determine structural adequacy.

3. Components - As used herein, components shall include:

a. Piping
b. Valves
c. Flanges
d. Heat Exchangers
e. Pumps
f. Periscopes
g. Antennas
h. Fittings
1. Tees
2. Strainers
3. Elbows
4. Reducers
5. Laterals
6. Couplings
i. Any other items within the scope as defined in A and not included in B.3.a through B.3.h
j. Electrical Hull Fitting
k. Mechanical Hull Fitting

4. Boundaries - The following specific areas are identified as not included within the scope of Design Review:

a. Compressed gas flasks external to the hull

b. Piping joints and components under 1/2 inch ips, or other items, the failure of which will result in an opening less than 0.200 square inches in area.

c. Electrical cables

SELECTED EXAMPLES OF DESIGN CHANGES WHICH MUST BE DESIGN REVIEWED

1. When considering the inherent design safety factors which exist within previously SUBSAFE Design reviewed systems, only those alterations which affect structural adequacy require a design review to permit continued SUBSAFE certification.

2. Based on above, the following are selected examples of alteration/ modification/changes which require design review to permit continued certification:

a. Relocation of piping supports (hangers) such that they are relocated or reattached to different frames and/or other structural members.

b. A change in the type of piping supports wherein the re-installed support is more rigid (i.e., removal of a rubber block type hanger and replacing same with a strap-clamp type hanger).

c. Change in system configuration (i.e., replacing bend offsets in pipe with straight sections).

(See NOTE next page)

NOTE

Regarding system flexibility in general refer to the Overhaul Specification (Deep Diving SSBN/SSN, Section 9480-0).

d. Replacing a component with material different than that specified in the applicable drawing (e.g., Replacing Cast 70-30 CuNi with Valve Bronze).

e. Replacing a component with one of a different configuration (e.g., Replacing an angle ball valve with an in line ball valve manufactured to a different drawing).

f. Changes in joint design wherein a notch is introduced (e.g., Replacement of a buttweld joint with a socket weld or sil-braze joint).

3. In summary, those changes which introduce geometric notches, weaker material and/or result in a significantly stiffer system either by configuration or support changes are considered warranting a design review. When changes categorized in paragraph 2 above are made, all pertinent documentation relative to the changes shall be submitted to NAVSHIPS for review. The REC generated for work accomplished shall identify all actions taken and shall be forwarded to the cognizant activities as required by reference (c).

SELECTED EXAMPLES OF MODIFICATIONS WHICH WOULD NOT REQUIRE DESIGN REVIEW TO PERMIT CONTINUED CERTIFICATION

1. The replacement of a section of piping with new material (not a substitute material), in accordance with latest specifications, utilizing original weld joint locations.

2. The addition of weld joints during a repair in accordance with the latest specifications. This action would require a weld joint identification drawing update but not a design review.

3. The use of backing ring welds in lieu of insert welds where allowed by latest specification or standard.

D.8 COPPER-NICKEL TUBING (PART IG).

BUSHIPS has received reports of leaking of highly stressed copper-nickel tubing in operating nuclear submarines. The leakage was caused by intergranular stress-corrosion attack of copper-nickel. Studies conducted on sections of the failed tube show the cause of the stress-corrosion attack to be chemicals in contact with the copper-nickel. (MOD I) It appears that some copper-nickel tube shows a great propensity for stress-corrosion attack while other copper-nickel tube shows none at all.

BUSHIPS considers that all copper-nickel tube in areas outlined under "Action" should be of a material which shows a good resistance to stress-corrosion attack. (MOD I) In addition, all submarine building and repair activities have been instructed to institute production control procedures to insure that alignment of final joints, whether welded, brazed, or mechanical, are made

with a minimum use of force. Shipyards and Forces Afloat have also been advised to avoid contamination of bilges by chemicals foreign to the systems and to flush systems if any possibility of contamination exists. (MOD I) To indicate that incipient cracking does not exist, all operating submarines have been instructed to conduct hydrostatic tests to a pressure equivalent to 1-1/2 times the current operating depth on those systems which are normally used for pumping bilges from the drain pump discharge to the sea including compensating water piping to expansion tanks.

(MOD I) Experience in using test specification Test Ts-1 DEV 0 and review of the specific piping involved have shown that modifications in approach are desirable to increase assurance that copper-nickel tube is resistant to stress corrosion cracking and to minimize the extent of rip-out of presently installed tubing.

(MOD I) It is considered that if there is reasonable assurance that chemicals have never been pumped through the pressurized portions of the drainage system, adequate integrity of the system exists and the removal of presently installed tube is not warranted.

D.9 EMERGENCY MAIN BALLAST TANK BLOW SYSTEM.

Studies of submarine main ballast tank blowing systems initiated by the Bureau of Ships in 1962 and continuing at this time have indicated that the flooding recovery capability of submarines can be improved if a significant increase in the MBT blow rate is provided. These studies have further established that with few exceptions the existing high pressure air stowage capacity and the distribution of high pressure air flasks are adequate to meet reasonable flooding recovery criteria.

Shipboard tests of normal main ballast tank blowing systems have demonstrated that existing systems do not provide an adequate level of reliability. Examples of deficiencies brought to light by these tests and critical engineering reviews are: excessive system complexity making operation dependent upon proper functioning of many valves, filters, reducers, etc.: freeze-up of components blocking air flow; destruction of filters during blowing resulting in air flow blockage or valve malfunction; loss of electrical power negating valve actuation systems or shutting air bank stop valves and whereby cutting off air supply to the MBT Blow System.

These studies and shipboard tests have dictated that a simple and reliable Emergency Main Ballast Tank Blow System be installed in each submarine as one of the essential elements for certification of the submarine for operation to test depth.

From BUSHIPS LTR C-SS/9481 Serial 440-018 of 17 February 1965.

2. The emergency blow system is designed to permit recovery of the ship in the event of a severe casualty. Its various features have been carefully prescribed as to operational characteristics, independence from the normal blow system, minimum complexity, non-destructive testing, and fabrication requirements. Certain other features of individual ships and their installed systems must be determined and approved to insure the system components are acceptable, that MBT strength is adequate and that safe test procedures are

provided. It is the purpose of this letter to outline the various requirements and to establish procedures to insure that all prerequisites leading to a certified system are completed.

3. The rapid expulsion of ballast at deep depths may, under some conditions, result in large roll and pitch angles on an otherwise stable submarine, and the rapid expansion of the air in the main ballast tanks with high rates of rise may result in excessive differential pressure across the ballast tank structure. The intent of this letter is to insure that adequate precautions are taken to prevent over-pressurizing main ballast tanks and to avoid possible loss of control of the ship due to hydrodynamic phenomena which have not previously been encountered.

From NAVSHIPS LTR C-SS/9481 Serial 6442-060 of 19 July 1966.

1. Reference (a) (COMSUBPAC ltr FF4-11:ky 9460 Ser 401/FO411 of 3 May 1966) requested that the Naval Ship Systems Command include controlled rise tests in all proposed EMBT Blow System certification sea trial programs. The controlled rise tests were conducted initially to gain technical information and determine the controllability under various combinations of EMBT blowing, speed, and trim angle.

2. NAVSHIPS concurs that controlled rise tests may be beneficial for training purposes, but believes they should not be included as a requirement in NAVSHIPS proposed test programs for EMBT Blow System certification because such trials are not required to demonstrate satisfactory performance of the system. Their introduction into the trial agenda for builder's trials would require contract modification and would probably result in a delay in delivery. NAVSHIPS will forward recommended procedures for conducting controlled rise tests as follows, for use by Forces Afloat for training:

a. With future test programs.

b. As a supplement to all existing test programs for which the ships involved have not yet deployed.

c. Directly to the Type Commander for ships which have deployed.

D.10 SEAWATER VALVE CONTROL (PART IIB).

Computer studies of submarine flooding recovery capabilities indicate a need for fast action to isolate flooding by shutting major seawater valves. Also the probable inability to determine the source of serious flooding dictates shutting immediately as many valves as possible without denying the use of main propulsion power to assist in recovery or to continue operations. Since lack of cooling water to the condensers will cause loss of propulsion in a few seconds, caution must be exercised in closing Main Sea Water System valves whereas cooling water for most auxiliaries may be secured for several minutes without deleterious effect. This allows time to determine and isolate the source of flooding. Rapid follow up action must be taken if flooding in the engine room does not stop upon closing auxiliary seawater valves and condenser cross connection valves, and for this purpose a means of remote power closure must be provided for the main seawater valves to permit rapid selective closure of port and starboard sides until the flooding is stopped.

Such prompt and knowledgeable action must be from a central, normally manned station protected from the effects of the flooding which must be controlled.

In developing requirements for seawater valve control the following factors have been considered:

a. Submarine operating depth

b. System and valve operating requirements

c. Compatibility with improved integrity and other capabilities that are being provided in accordance with this submarine safety certification package, i.e., the provision of the Emergency MBT Blow System outlined in Part IIA will permit recovery as a minimum from a 4 inch diameter hole with a coefficient of discharge of 1.0 with flooding continuing for 90 seconds. This blow capability permits retention of manual actuation of small size valves to secure flooding which otherwise would be required to be remote power operated if this improved blow capability were not provided.

From NAVSHIPS LTR SS/SSN/SSBN/5100 Serial 525-2580 of 19 December 1966.

1. Reference (a) (NAVSHIPS LTR SS/SSN/SSBN/5100 serial 525-405 of 22 March 1965) was intended to clarify that where NAVSHIPS has authorized emergency remote closure for 3 and 3-1/2 inch I.D. seawater system valves as a SUBSAFE Improvement Item, only hull valves are applicable.

2. Part IIB of enclosure (1) to reference (b) (BUSHIPS LTR Ser 525-0462 of 20 December 1963 and changes thereto) requires emergency remote closure for all hull, back-up and flooding control valves 4 inches I.D. and larger in sea-connected systems open to sea below 200 feet during any normal mode of operation. The seawater systems in SSN 588 Class, SSBN 598 Class and other medium depth submarines have a number of valves that are 3 and 3-1/2 inch I.D. It was considered that emergency remote closure for these valves would provide a substantial improvement in safety. Specific authorization was given to provide this additional capability. There is no intent to imply that the SUBSAFE Package, reference (b) has been or will be extended to include 3 and 3-1/2 inch I.D. sizes.

D.11 ACCESS TO AND OPERATION OF VITAL EQUIPMENT (PART IIC).

Ref: (a) BUSHIPS Ltr SS/5100 Ser 525-1990 of 21 Oct 1963
(b) CNO Ltr Ser 69P31 of 13 Mar 1964
(c) CO, SUBSAFECEN Ltr Ser 42/54 of 23 Apr 1965

a. Experience in submarine operation by Forces Afloat and investigations by submarine design review boards brought into question the installation of certain habitability items in that they may be encroaching on the safety of operation. In particular, installation of false ceilings and bulkheads for habitability purposes brings about the possibility of degradation of the efficiency of damage control systems by limiting prompt access to vital system components. Furthermore, in the event of severe shock, such habitability features can become missiles that injure personnel, damage vital systems, or jam and prevent access to such systems.

b. The ability of personnel in a submarine to maintain their physical position, and at the same time perform effective emergency work at vital stations is also an increasing problem. Large up and down angles can be assumed either intentionally or inadvertently in a relatively short time in high performance submarines. Slippery decks or lack of physical support for personnel could be responsible for the loss of effectiveness of a watchstander at a vital station under these circumstances.

c. Reference (a) described such questions and problems, and made the following recommendation to the Chief of Naval Operations.

> "..... the Bureau recommends that as a matter of urgency the Chief of Naval Operations establish a board of experienced submarine operating personnel assisted by a BUSHIPS representative to evaluate the desirability of installing the various habitability items against their possible deleterious effect on the overall safety of submarine operation. It is envisioned that the board would develop specific guidelines which the Bureau of Ships would invoke as requirements to submarine construction activities to control the provision of necessary habitability features. These guidelines would also permit evaluation of operating submarines and form the basis for corrective action, either by ShipAlt or Forces Afloat effort, to hazardous conditions now existing."

d. Reference (b) directed the Submarine Safety (SUBSAFE) Center to investigate the problem of encroachment or safety of habitability improvements and to make any appropriate recommendations in this area to the Chief of Naval Operations.

e. Final recommendations on the general problem of accessibility (Guideline Manual for Access to Vital Equipment) were submitted by the Submarine Safety Center to the Bureau of Ships in reference (c) and took the form of a proposed methodology for quantitative evaluation of the time requirements for access to any function component or area on the ship. A copy has been provided to each submarine building and overhauling activity for use in evaluating general accessibility.

f. NAVSHIPS and Submarine Safety Center have reviewed the items of concern outlined in paragraphs a. and b. above, and have determined that insuring accessibility to vital equipment involved in immediate and follow-up action to effect emergency recovery of the submarine and maintaining way should be the only mandatory requirements for this certification criterion. Items in the follow-up action category are generally normal operators associated with:

(1) Components that are vital to the recovery evolution but not necessarily activated in the initial seconds of the recovery sequence, such as compartment pressurization valves, or

(2) Components that are controlled by alternate methods in emergency recovery actions, such as the Engine Room ASW valve normal operators.

Emergency mode operators are implicit in the above wherever they constitute the first back-up operators in the case of casualty to a primary integrity or

dynamic control system vital to the ship's safety. An example would be the emergency transfer valve on the steering stand.

Tertiary and other necessary access should be provided as a function of normal design practices and shipboard experience using the SUBSAFECEN's "Guideline Manual for Access to Vital Equipment" for guidance. Additional areas of concern noted in a. and b. above will be evaluated on a case basis and appropriate action taken by cognizant naval activities under the coordination of the Submarine Safety Center.

g. The mandatory accessibility criterion for SUBSAFE Certification herein contained, incorporates the methodology of reference (c) in a Test Form. The experience gained during the overhaul and construction of several submarines has been utilized for the compilation of a typical list of equipment components that must meet the accessibility criterion for certification purposes. Added to these are certain qualitative conditions that must be met for satisfactory accessibility.

D.12 DIVING PLANE RELIABILITY (PART IIIA).

a. The critical requirements for efficient and safe control of the attitude and depth of a submarine both when at low speed and near the surface and when at high speed have necessarily resulted in compromises in control system design. Large diving plane angles and high rates of motion are required for good depth control at low speed, particularly in rough seas and near the surface, whereas small plane angles provide sufficient control for high speed operation. At high speed, large angles and fast plane motion are dangerous and system malfunctions have placed submarines in dangerous attitudes and have resulted in their exceeding test depth. The development of higher speed and more maneuverable submarines has generated a need for improved control systems and has led to sophisticated electro-hydraulic position control systems which are more subject to failure than the hydraulic rate control systems formerly used in ships of less submerged speed.

b. A review of diving plane control systems has been initiated to establish what system modification, if any, must be made to achieve the required control without sacrificing reliability in this vital system. Results of this review may require installation of a new system or particular modifications directed toward improved reliability. In the interim, known safety improvements are being cited and tests and inspections required to improve reliability. Failure of major components between the rams and the planes would result in loss of all stern plane control and, in recognition of this fact, additional emphasis is to be placed on control of quality in that area.

D.13 MAPPING (PART IVA).

Reference (a) (NAVSHIPS ltr serial 525-1402 of 12 January 1967) outlines the requirements for SUBSAFE Selected Record Drawings/Data and preparation of Submarine Certification Boundary Books. When invoked by NAVSHIPS or the Type Commander, these requirements provide the basis for establishing specific requirements by design agents or planning yards and an orderly system for recording the completion of all necessary work leading to certification of a system.

D.14 RECORDING AND REPORTING (PART IVB).

Complete records must be kept for each portion of work outlined in this package leading to certification for unrestricted operation down to design test depth. Reference (a) (BUSHIPS 250-634-6 (Interim)) provides guidance for quality control records and internal audit procedures for sil-brazed joints. Suitable records in other areas shall be as required in other applicable instructions or as determined necessary to provide complete documentation for this certification package.

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APPENDIX E

SUBMARINE MATERIAL CERTIFICATION ENVELOPE FOR PRE-SSN 688 CLASS

Appendix E provides general guidance for determining the submarine material certification envelope based on the specific certification requirements of the original SUBSAFE Manual Rev (-).

E.1 DEFINITION OF SUBMARINE MATERIAL CERTIFICATION ENVELOPE.

The submarine material certification envelope comprises that portion of the submarine essential to maintenance of watertight integrity and recovery from a seawater flooding casualty. The submarine material certification envelope includes the following two major subdivisions:

a. Submarine Material Certification Boundary.

b. Pressure Hull Integrity Boundary.

E.1.1 SUBMARINE MATERIAL CERTIFICATION BOUNDARY.

The boundary applies to those inboard piping and mechanical systems maintaining watertight integrity and recovery capability from a flooding casualty. These systems include Main Sea Water, Auxiliary Sea Water, EMBT, Seawater Valve Control, and Diving Plane. Re-entry and maintenance requirements for continued unrestricted submarine operations to design test depth, as specified in Chapter 6, apply to components within the submarine material certification boundary.

E.1.2 PRESSURE HULL INTEGRITY BOUNDARY.

The boundary applies to those parts of the pressure hull, penetrations, and appendages thereto designed to preclude entrance of seawater into the submarine. Additional guidance, contained in the following paragraphs, must be applied to determine the inboard limits of certification for each item. Re-entry and maintenance requirements for continued unrestricted submarine operations to design test depth, as specified in Chapter 6, apply to components within the pressure hull integrity boundary.

E.2 PRESSURE HULL INTEGRITY BOUNDARY.

The pressure hull integrity boundary consists of the pressure hull structure, pressure hull fittings, and piping systems at the junction with the pressure hull structure or fittings.

E.2.1 PRESSURE HULL STRUCTURE.

The pressure hull structure comprises the following components:

a. Pressure hull plating, end-closure bulkheads, and associated framing.

b. Plating and framing for hard tanks, including their manhole covers and coamings, subjected to test depth submergence pressure.

E.2.2 PRESSURE HULL FITTINGS.

Pressure hull fittings attached either mechanically or welded are, in general:

a. Hull inserts, including castings, forgings, or those fabricated from plate that are welded into the pressure hull plating by a type of butt joint.

b. The insert portion of components which form an integral part of the pressure hull envelope serving both as an insert and component, such as inboard and outboard diesel intake and exhaust valves, inboard and outboard ventilation valves, escape trunks, torpedo tubes, signal ejectors, trash disposal units, etc.

c. Sea chests subject to test depth submergence pressure.

d. Torpedo tube water ejection cylinder sleeves.

e. Stern tubes when exposed to full submergence sea pressure differential.

f. Secondary propulsion motors.

g. Hull penetrating masts.

h. Stuffing boxes and shafts.

i. Piping system sleeves.

j. Electrical penetrations.

k. Grease fittings.

E.2.3 PIPING/COMPLEX SYSTEMS.

The affected piping systems include:

a. Sea-connected piping systems at the junction with the pressure hull structure or fittings.

b. Non-sea-connected piping systems penetrating the pressure hull, whose normal operating pressure is less than design collapse depth.

1) Air and hydraulic systems having internal pressure less than full submergence sea pressure.

2) Ventilation and exhaust components.

c. Non-sea-connected piping systems penetrating the pressure hull, whose normal operating pressure is greater than design collapse depth, require certification of the joint where the pipe penetrates the pressure hull.

d. Components comprised of complex mechanical systems which form a part of the pressure hull and contain identifiable hull and back-up closure devices.

1) Torpedo tubes and water ejection cylinders. (The muzzle door serves as the hull valve and the next inboard valve or closure; i.e., torpedo tube drain valves, breech door, etc., as equivalent of back-up valves.)

2) Access and escape trunks, loading hatches, and doors thereto.

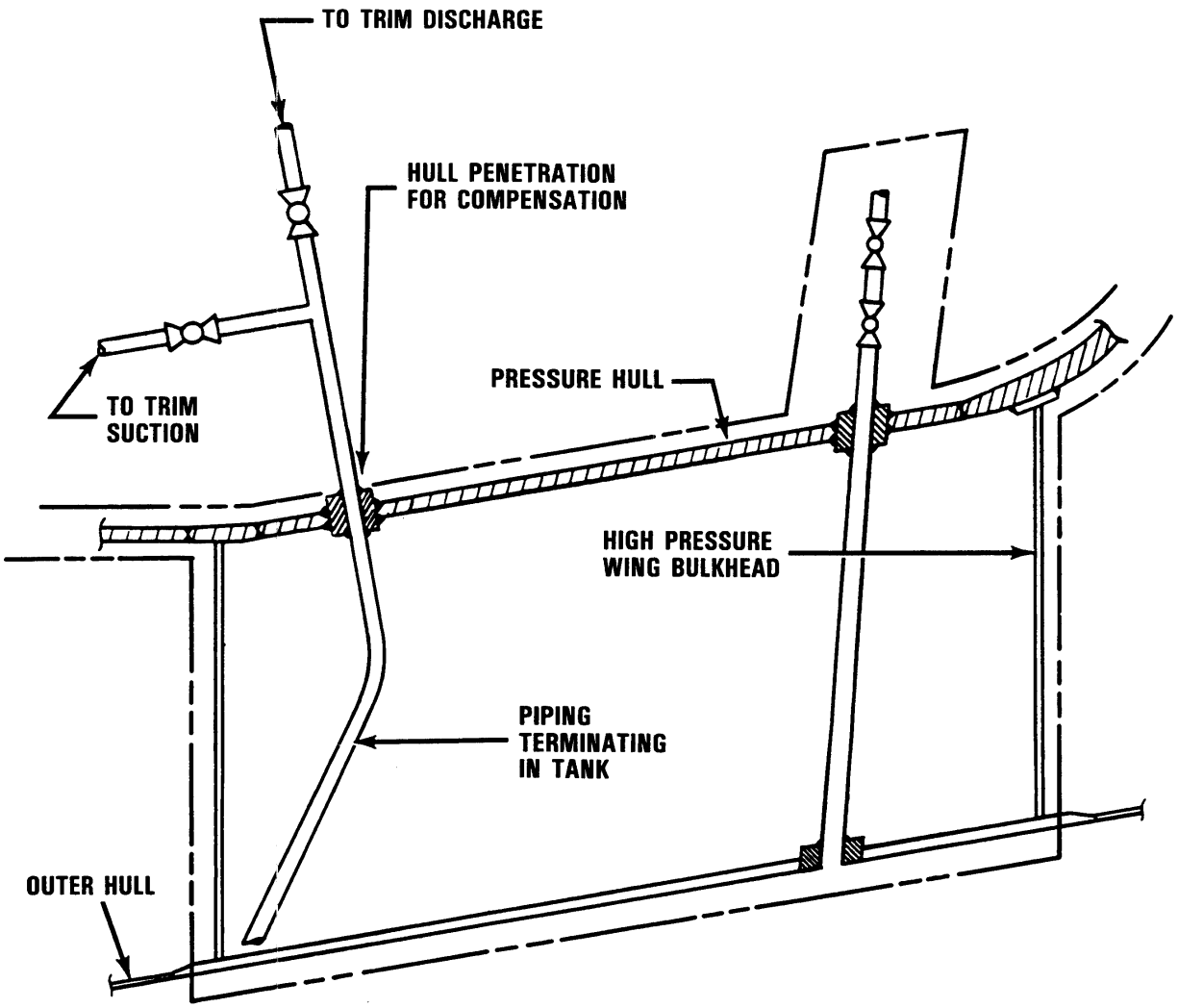
3) Signal ejectors/launchers.

4) Trash disposal units.

5) Shaft seals.

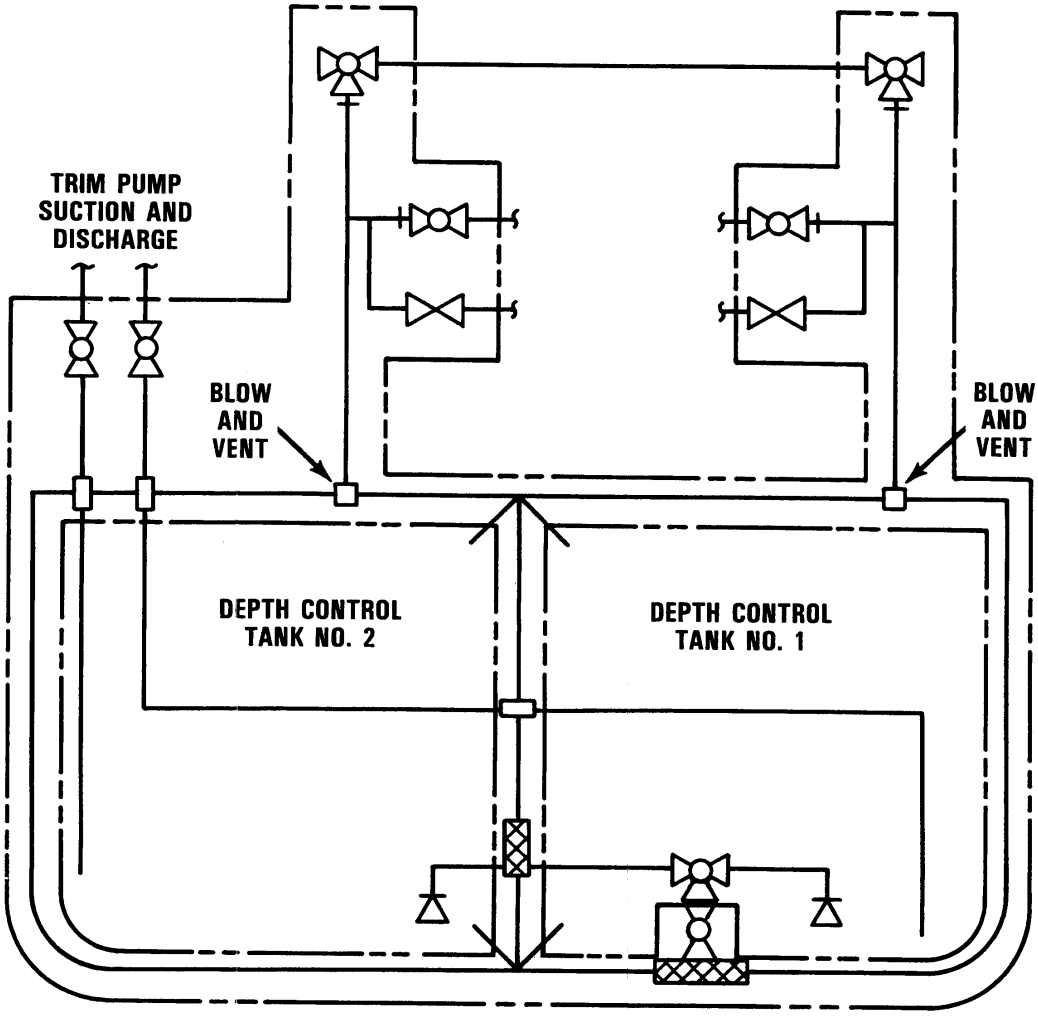
E.3 ADDITIONAL PRESSURE HULL INTEGRITY BOUNDARY GUIDANCE.

This paragraph and the accompanying sketches supplement Chapter 4 by providing typical examples of certification boundaries for the hull integrity boundary and those components or piping which form a part of it. The accompanying sketches may be used as guidance in establishing boundaries for installation similar, but not identical, to the examples contained herein. On each sketch the boundary is identified by a broken line. Use the applicable Submarine Safety Certification Boundary (SSCB) Book and applicable SUBSAFE mapping drawings to determine boundaries subject to the requirements of this manual.



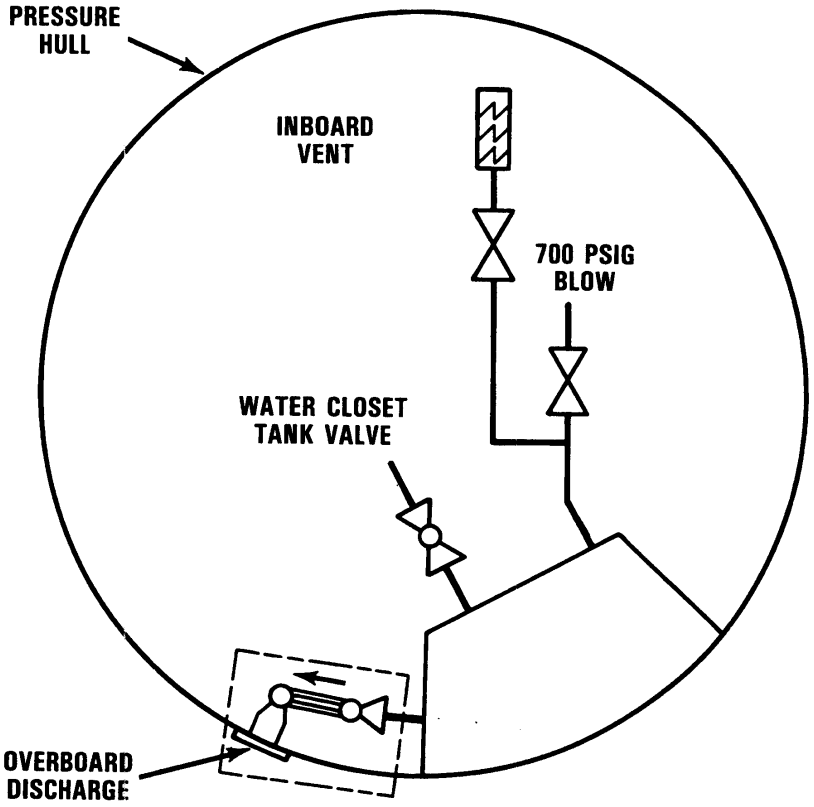
NOTE: For cases where piping passes through a hard tank with an opening to the sea, the first valve inboard of the tank is the hull valve, and the second inboard valve is the back-up valve.

Figure E-1. Typical Hard Tank Structure.



NOTE: For depth control tanks, the certification boundary includes hull valve HOV-1, depth control tanks, and all piping, including first stop valve from the depth control tank that is subjected to submergence pressure.

Figure E-2. Typical Hovering System.

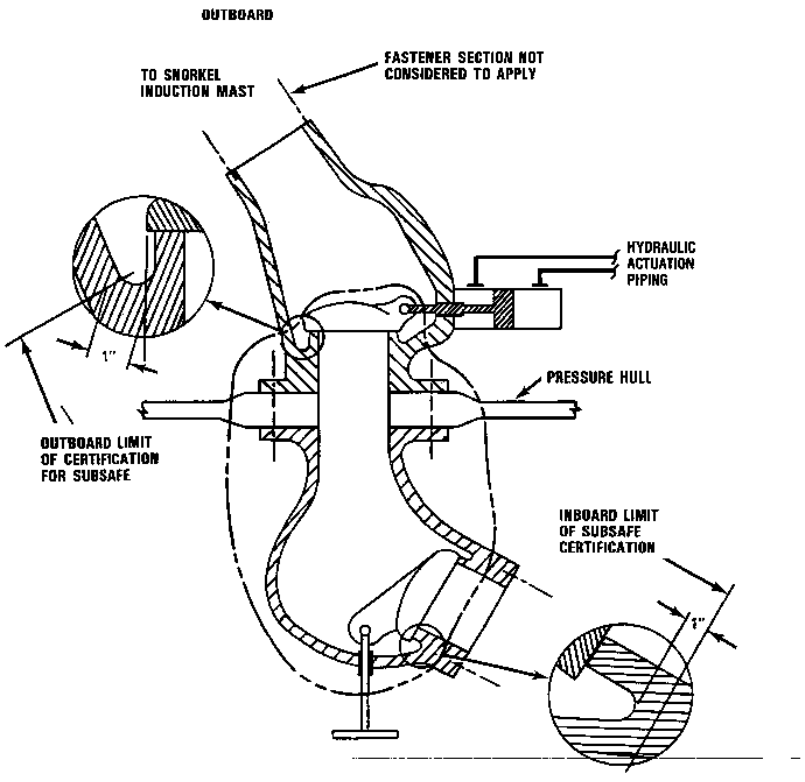


NOTE: Where the sanitary tank is a hard tank:

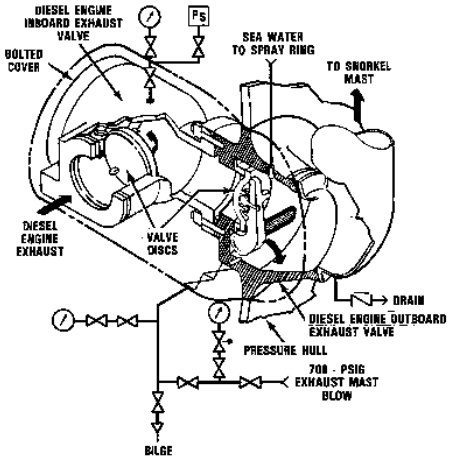
a. Not flooded directly from the sea, certification requirements do not apply for the first valve inboard of the back-up valve.

b. Not normally open to sea below 200 feet, certification requirements do apply for the flood valve (hull valve) and the first inboard valve (back-up valve).

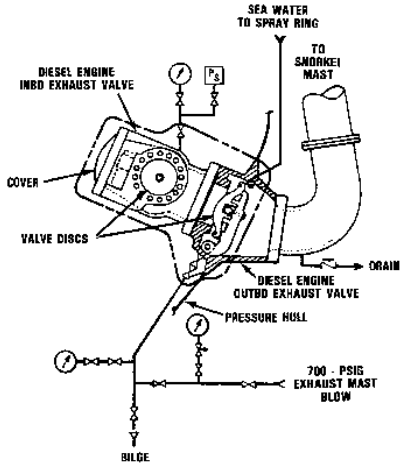
Figure E-3. Sanitary Tank (SSN 637 Class).



AIR INDUCTION



DETAIL OF ENGINE EXHAUST (SSN 637 CLASS)



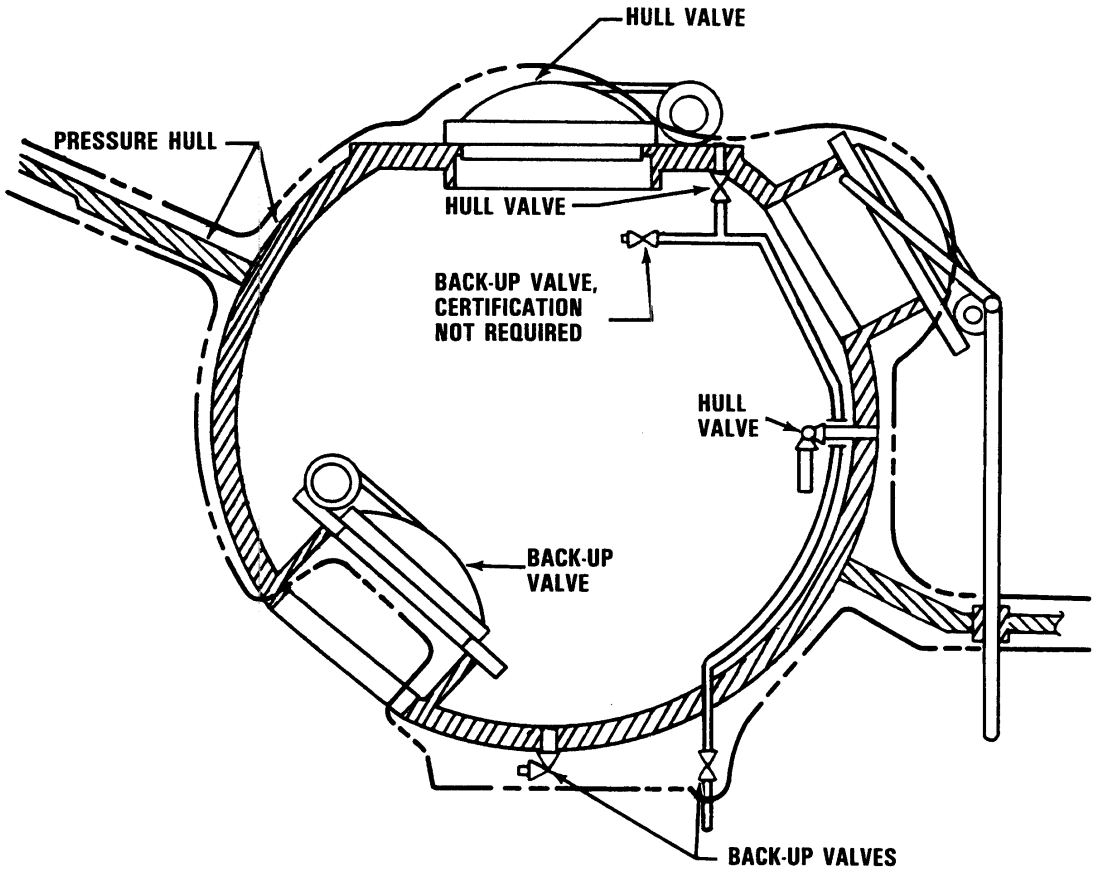
ENGINE EXHAUST (SSN 637 CLASS)

NOTES:

a. Induction and exhaust valves in general should include that section from the inboard flange of the back-up valve to the outboard flange of the hull valve where "hull" and "back-up" valves are as shown in the sketches. "Flange" means weld preparation or sil-braze socket where appropriate.

b. In those cases where the valve casting contains a large part of the valve body outboard of the valve seat (or inboard in the case of back-up valves) and this part does not form a pressure containing section, some relaxation of casting quality may be acceptable in the non-pressure containing parts of the valve body. This should be shown in the shooting sketches required for each casting. For these cases, the ground rule used is to consider that cast material in the unpressurized portion of the casting which is located more than one inch from the pressure boundary need not be rejected because of gross shrinkage porosity or inclusions.

c. When the piping outboard of the hull valve is required to withstand pressure, as in the case of piping between engine room snorkel exhaust valves, the entire hull valve casting must be certified even though some parts do not fall within the hull to back-up areas as defined herein.



NOTE: When double hatch closure is used, the space between hatches is not normally flooded. Structure between hatches is accorded the same treatment as the pressure hull. All penetrations of this space are treated as penetrations of the hull. For any piping penetration of the outer trunk boundary, certification of the first valve is required as hull closure. For all piping penetrations of the inner trunk boundary, certification of the first valve is required as back-up closure.

Figure E-5. Typical Escape Trunk Arrangement.

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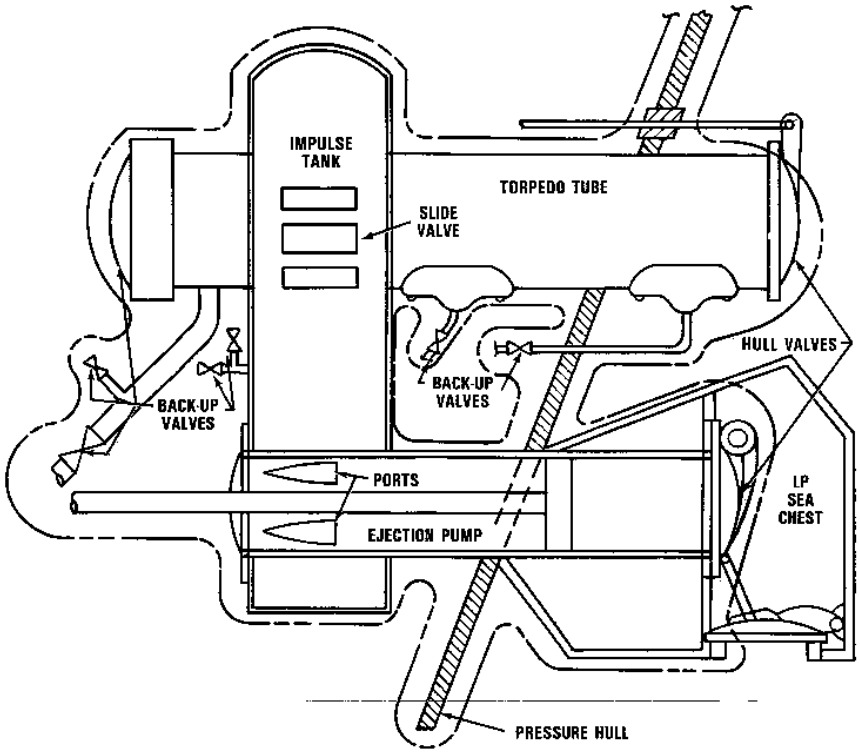


NOTES:

a. The muzzle doors and the slide valves of the torpedo tubes are considered to be the hull valves.

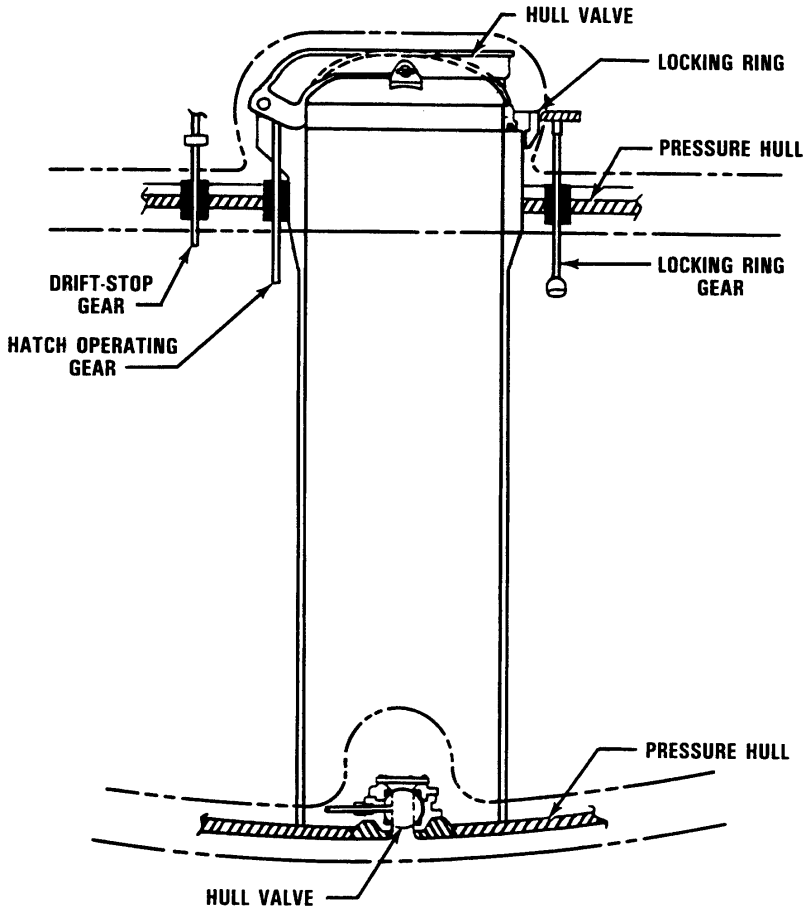
b. The breech doors and the first valve in each line coming off the tubes are included in the back-up structure.

c. The impulse tank, and ejector pump and head, when included within the pressure hull, are to be considered hull structures. The first inboard valves of any lines penetrating the impulse tank or ejection pump are considered hull valves, except where ejection pump muzzle door and associated hull boundary are considered the hull valves.

d. Considering the muzzle door as the hull creates a tendency to attach secondary importance to the tubes themselves and the attachments to the tubes. This must be guarded against since there is a requirement for the tubes to be pressurized and fired at test depth. There is no intent herein to permit any relaxation of weld quality and inspection in any structure between the hull and back-up valves.

e. In general, the torpedo tube system is covered in the SSCB book and other pertinent documents with the possible exception of the interlocks in the interface area of the muzzle door closure system and the muzzle/breech door interlocks. The torpedo tube interlocks are not specifically considered material certification items; however, those interlocks in the muzzle and breech door closure system that affect the operation shall be controlled in accordance with the re-entry requirements of Chapter 6 of this manual. Improper installation/adjustment of the hydraulic and air interlock valves and associated linkages can adversely affect the functioning of the muzzle door closure system, which is a material certification system with operability requirements.

Figure E-6. Torpedo Tube Penetrations (SSN 594 and SSN 637 Classes).

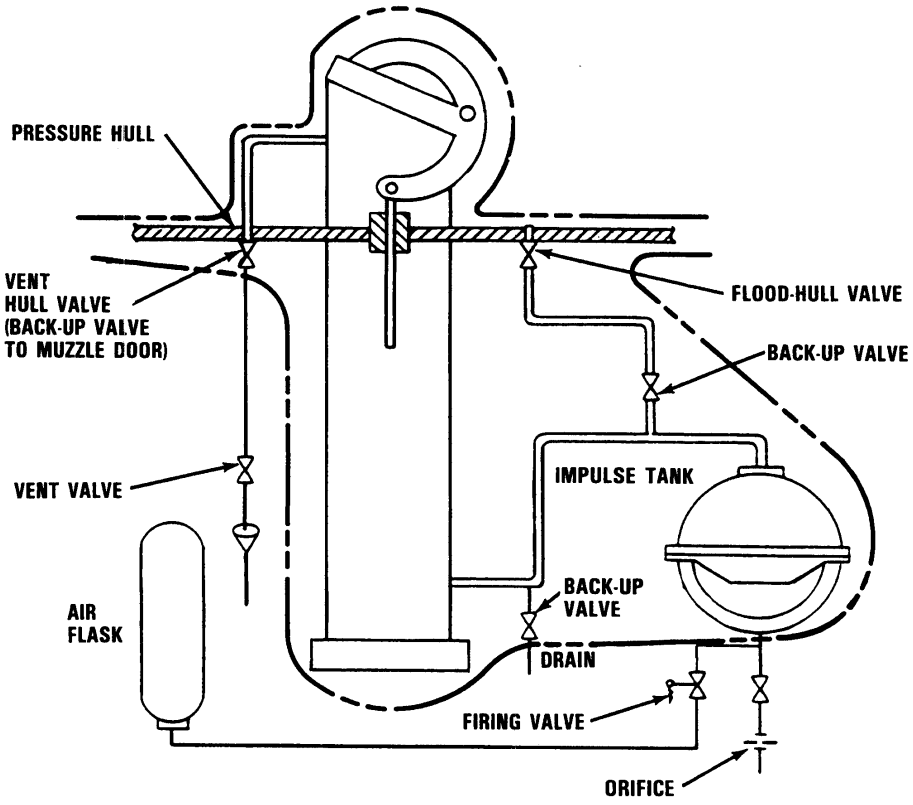


NOTES:

a. The upper hatch of the missile tubes is considered to be the hull valve.

b. The material certification criteria is not applicable to ballistic missile tubes except castings and design review for that portion forming a part of the Pressure Hull Integrity Boundary. Specifically, no additional provision over those currently required by ship's specifications are intended for the outer door closure to control flooding or for NDT inboard of the outer door.

Figure E-7. Typical Missile Tube Penetration.



NOTES:

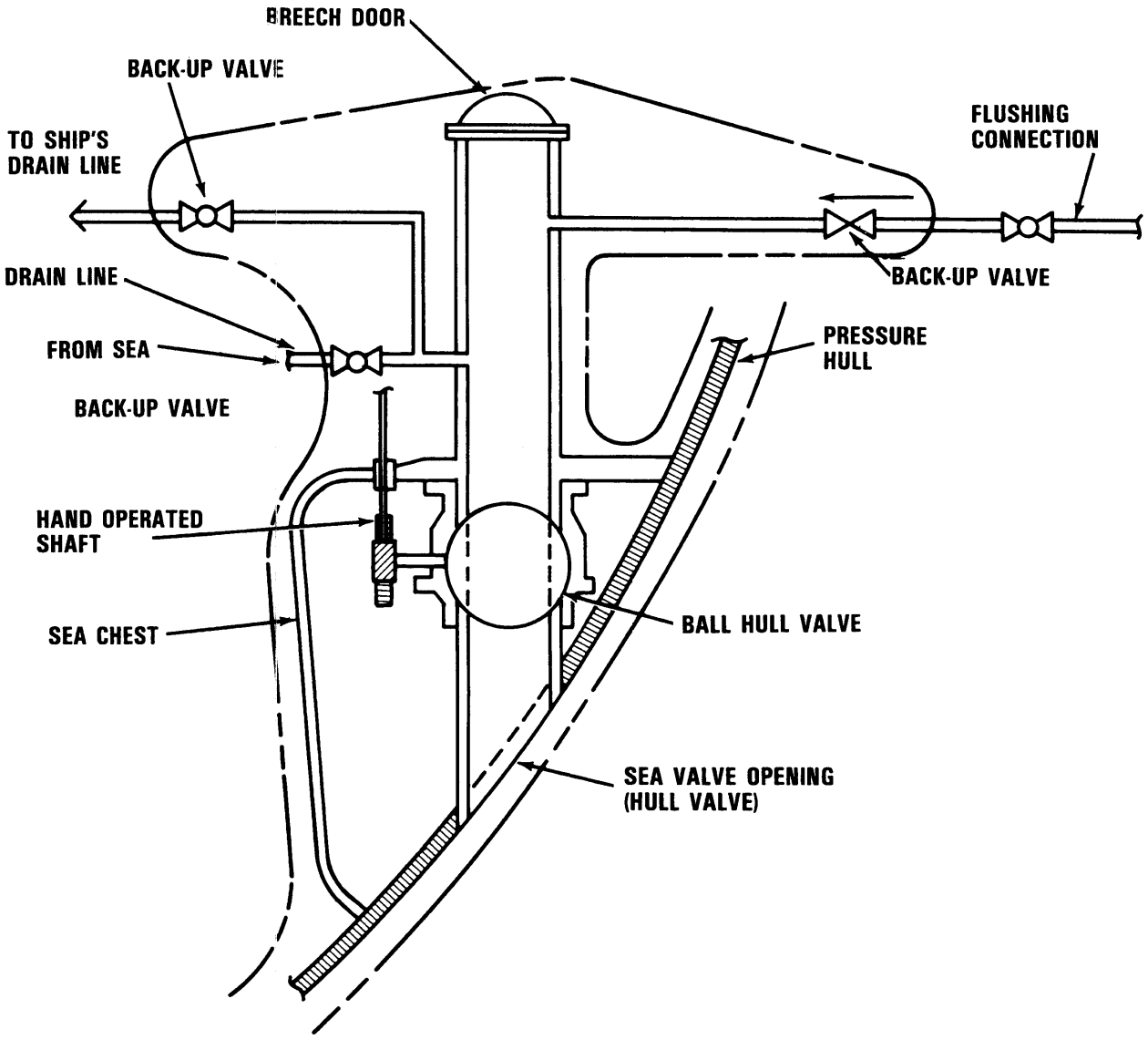
a. The muzzle door of the signal ejector is considered to be the hull valve.

b. The external vent piping is considered to be hull integrity pipe.

c. The signal ejector is designed to be operable at collapse depth.

d. The breech door and breech door locking ring should be accorded particular attention since they are back-up structure by this definition.

Figure E-8. Typical Signal Ejector.



NOTES:

a. The muzzle door of the trash ejector is considered to be the hull valve.

b. The breech door and the first valve inboard of the barrel are included in the back-up structure.

Figure E-9. Typical Trash Ejector.

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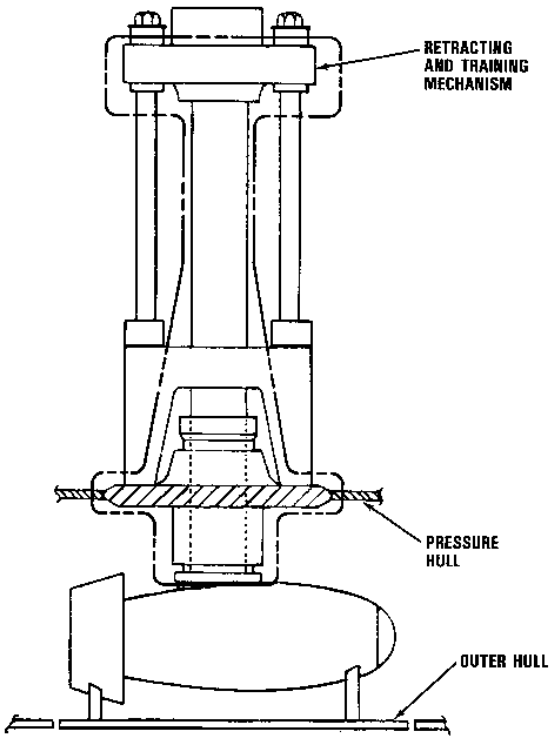
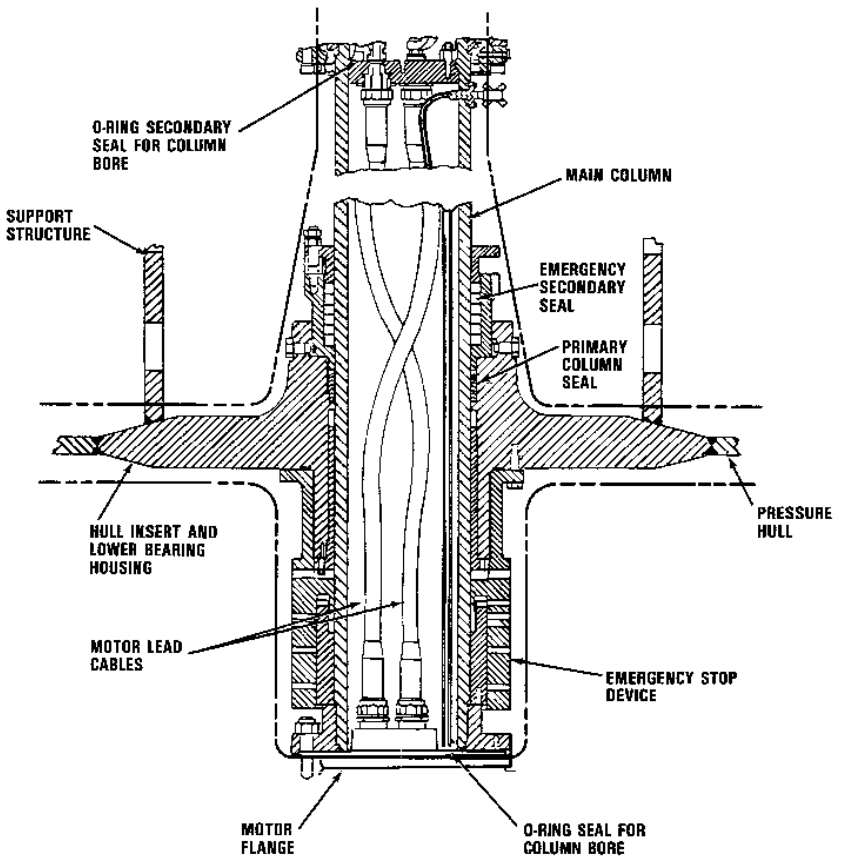
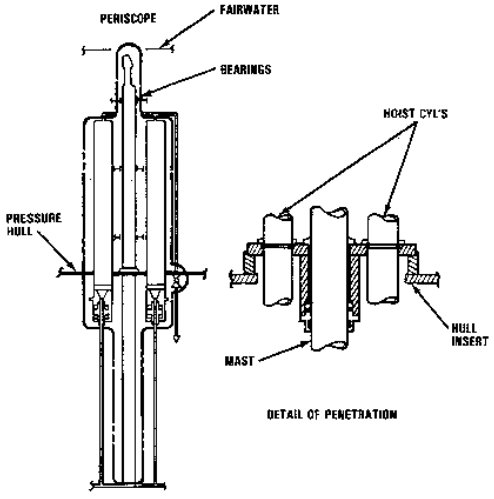


NOTE: That portion of the hull insert, inner and outer gland, retracting and retaining mechanism, and shaft to the secondary propulsion motor flange attachment, failure of which would cause uncontrollable flooding into the hull, are considered a part of the certification boundary.



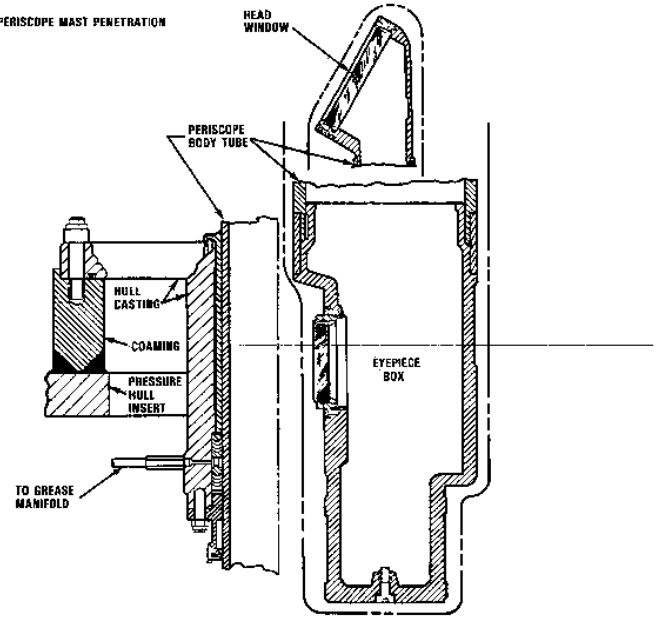
MAIN COLUMN PACKING GLAND

Figure E-10. Typical Secondary Propulsion Motor Arrangements.

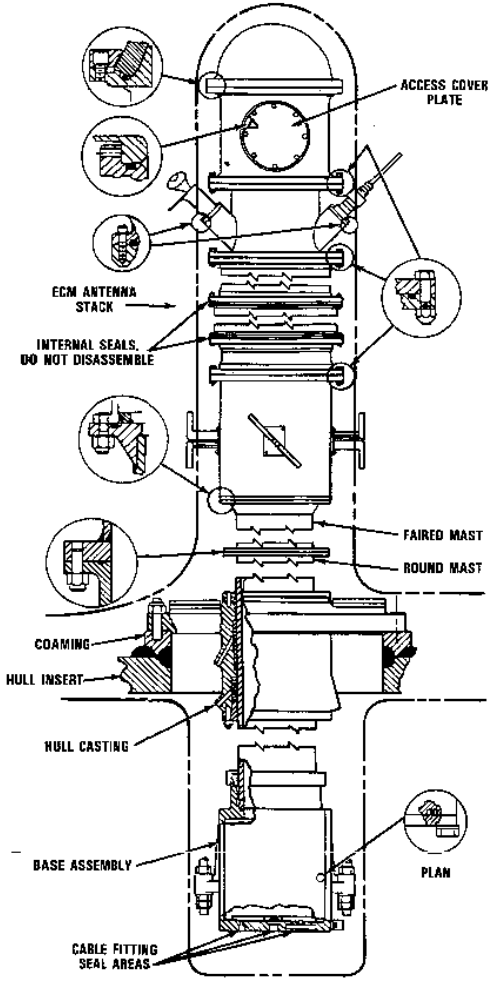


TYPICAL PERISCOPE MAST PENETRATION

DETAIL OF PENETRATION



DETAIL OF TYPICAL PERISCOPE MAST



DETAIL OF TYPICAL ECM/DF ANTENNA MAST

NOTES:

a. The primary boundary is that portion exposed to sea pressure and includes the following items:

(1) Hull seals.

(2) Hoisting cylinders; that portion extending beyond the pressure hull (including stuffing glands).

(3) Fasteners associated with (1) and (2) above.

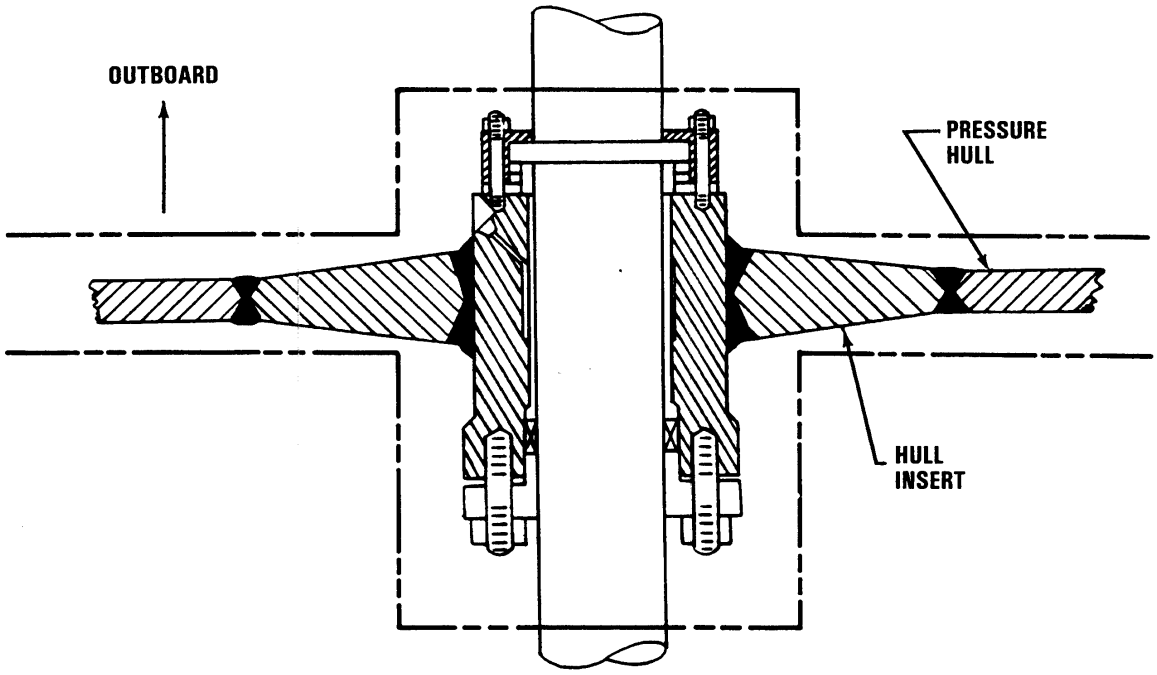
(4) That portion of the mast extending beyond the pressure hull when in the housed position.

b. The secondary boundary is that portion inboard of the pressure hull and includes the following items:

(1) That portion of the mast inboard of the pressure hull when in the housed position.

(2) That portion of the hoisting cylinders inboard of the pressure hull.

Figure E-11. Typical ECM/DF Antenna Mast and Periscope Mast Penetrations.



NOTE: The certification boundary is that portion of the hull insert, inner and outer gland, and shaft that forms a part of the hull boundary, failure of which would cause uncontrollable flooding into the hull.

Figure E-12. Typical Capstan Shaft Penetration.

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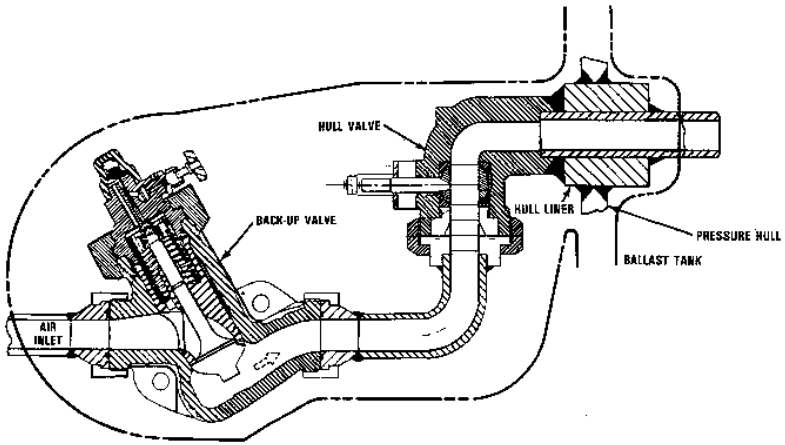
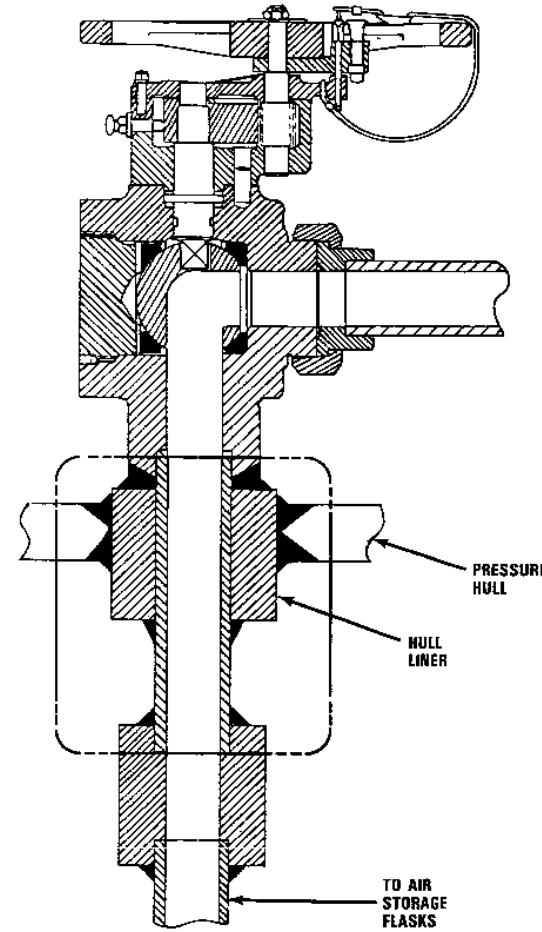


E-13.1

NOTES:

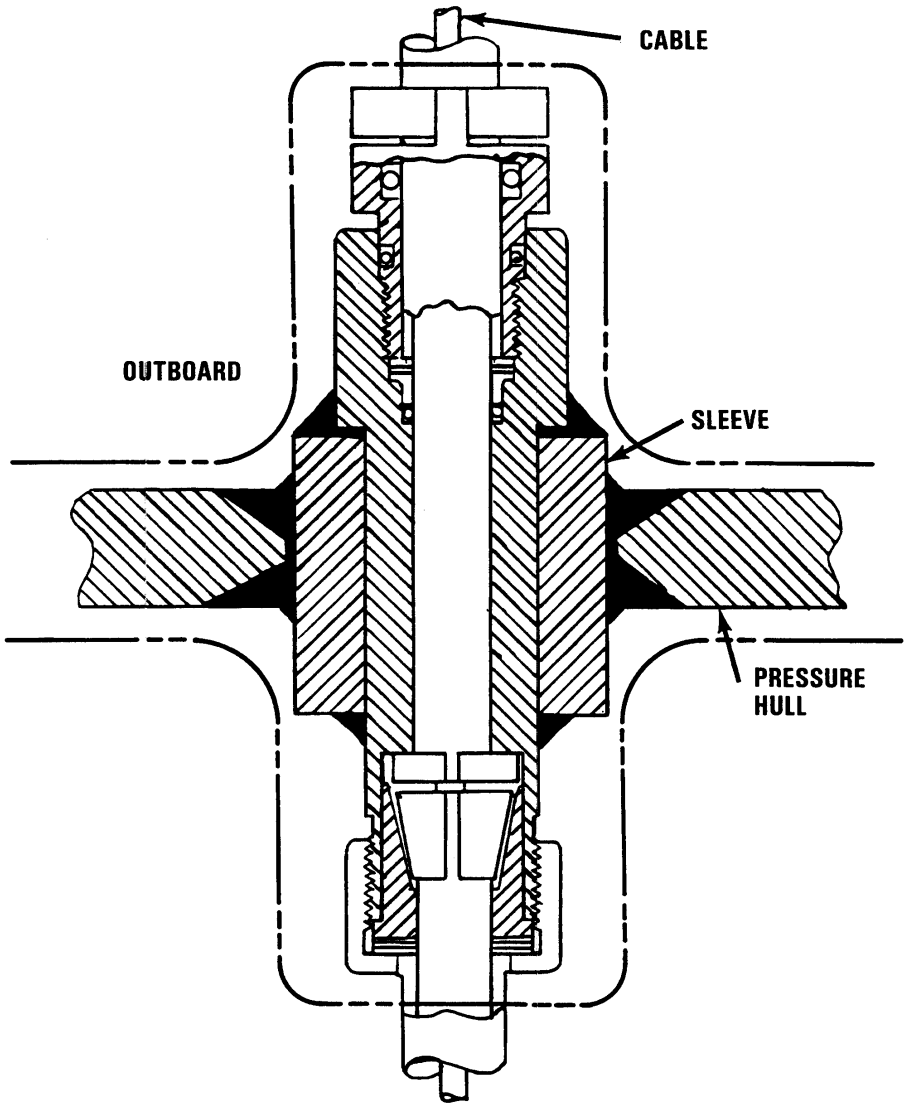
a. For those systems that penetrate the pressure hull and whose maximum normal operating pressure is greater than test depth pressure, only the pipe nipple and insert assembly shown on Figure E-13.2 shall be classified as hull boundary. For all other systems penetrating the pressure hull, the hull and back-up valve are considered boundary.

b. Capped and connections for filling or charging and discharging lines cannot be considered hull valves since these connections are frequently used with no assurance that the cap will be reinstalled.



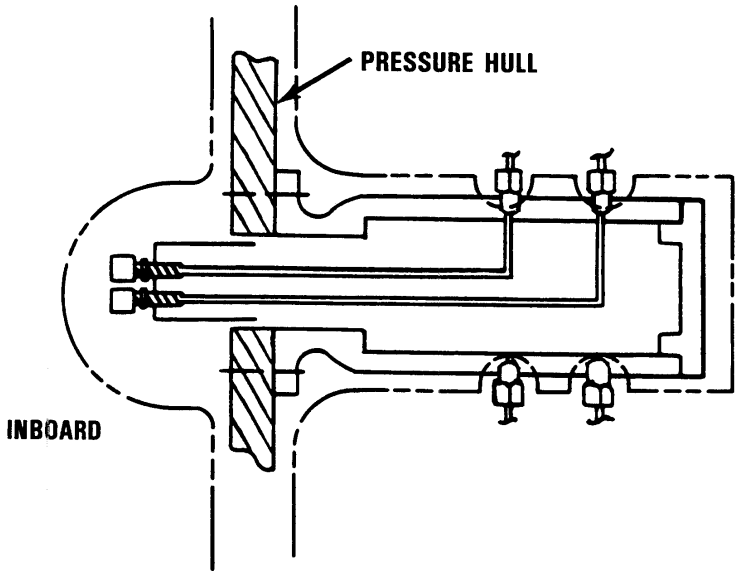
E-13.2 TYPICAL HIGH PRESSURE AIR SYSTEM PENETRATION

Figure E-13. Typical Air Systems Hull Penetrations.



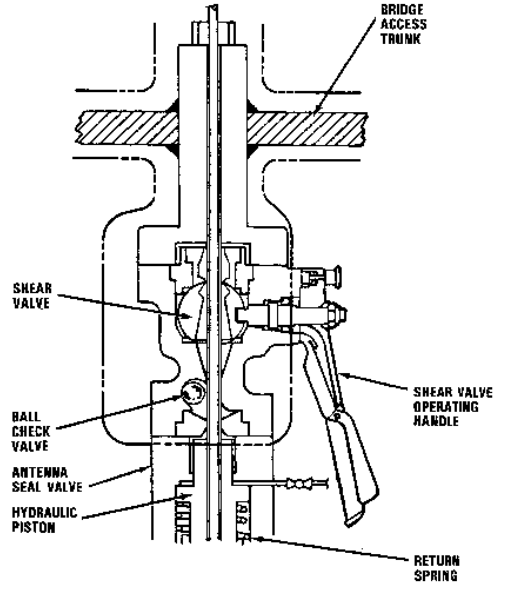
NOTE: The certification boundary is that portion of the hull insert and inner and outer glands, failure of which would cause uncontrollable flooding within the hull.

Figure E-14. SAED Type Hull Tube.



NOTE: For grease fittings, the area subject to sea pressure differential is considerd to include the hull and back-up structure. Other types of grease fittings are being used. In every case, both hull and back-up valves should be included.

Figure E-15. Grease Distribution Valve.



FLOATING WIRE ANTENNA SHEAR VALVE (BRA-18)

NOTES:

a. The certification boundary is that portion of the hull and back-up valve, failure of which would cause flooding within the hull or affect ability to open or shut the hull or back-up valve.

b. For further information, refer to applicable technical manual.

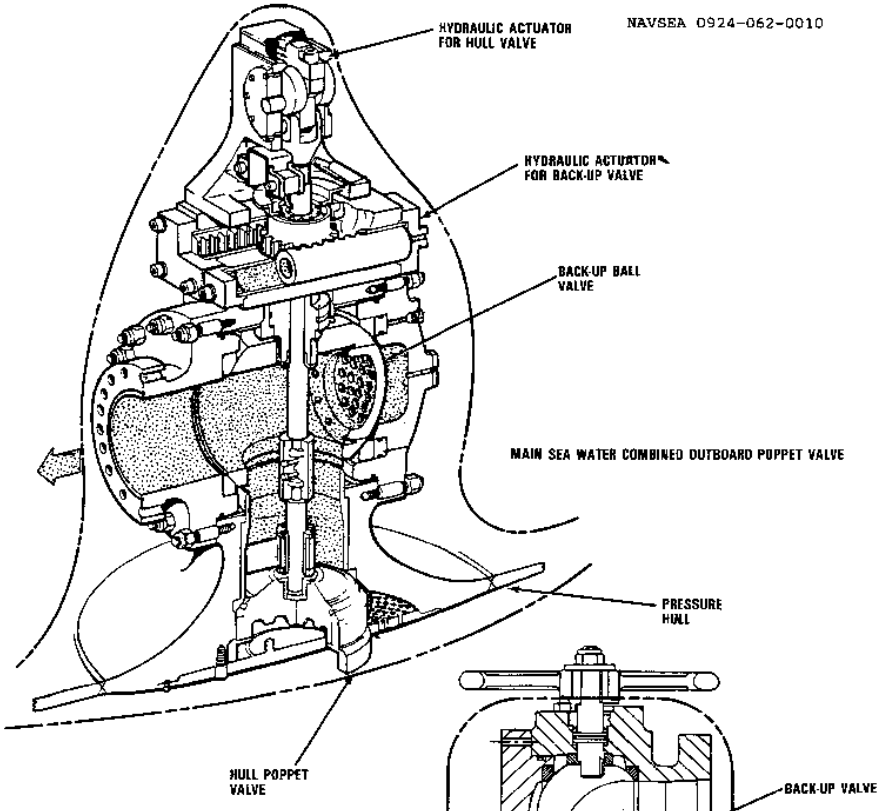
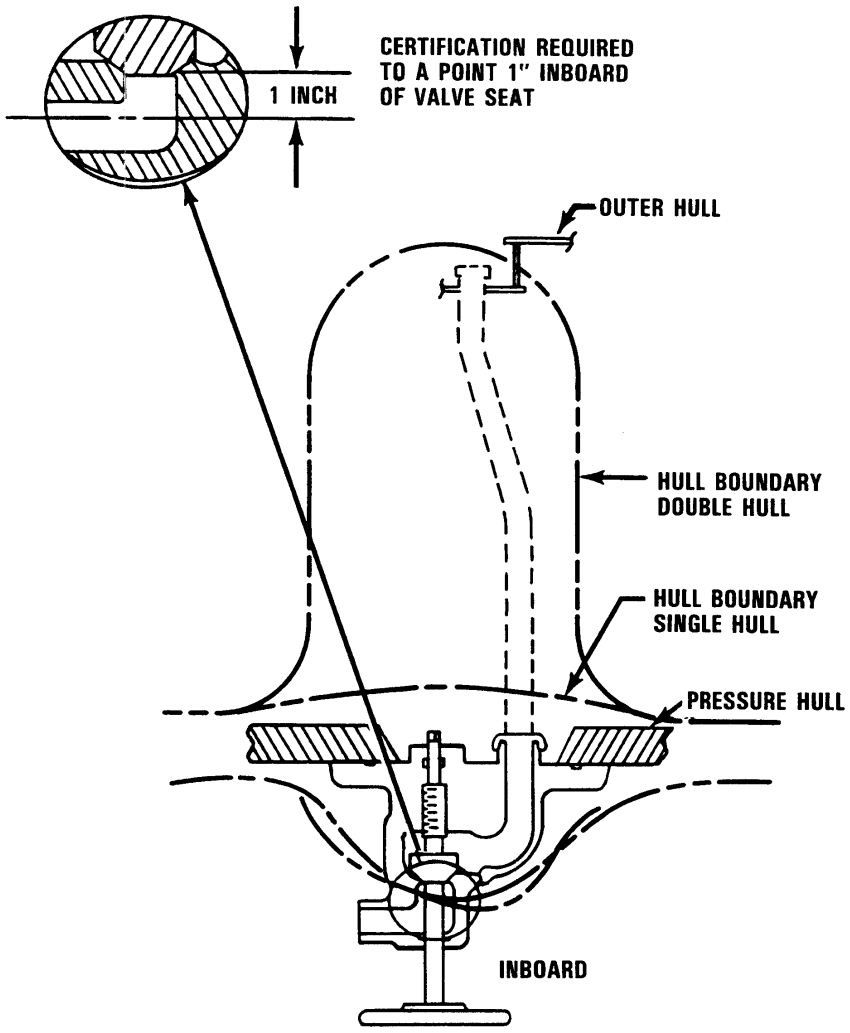


Figure E-16. Miscellaneous Hull Valve Arrangements.



NOTES:

a. The external salvage valves are normally shut valves. There is no back-up valve installed or desired on salvage fittings due to their unique service requirements.

b. Air salvage valves are infrequently used and periodically inspected as part of a formalized salvage inspection by forces afloat. No back-up valve is provided. The capped closure of the standpipe may be considered the hull valve for purposes of the certification package. The back-up structure extends to the seat of the salvage valve and 1" inboard of the seat of the valve body.

Figure E-17. Salvage Valve.

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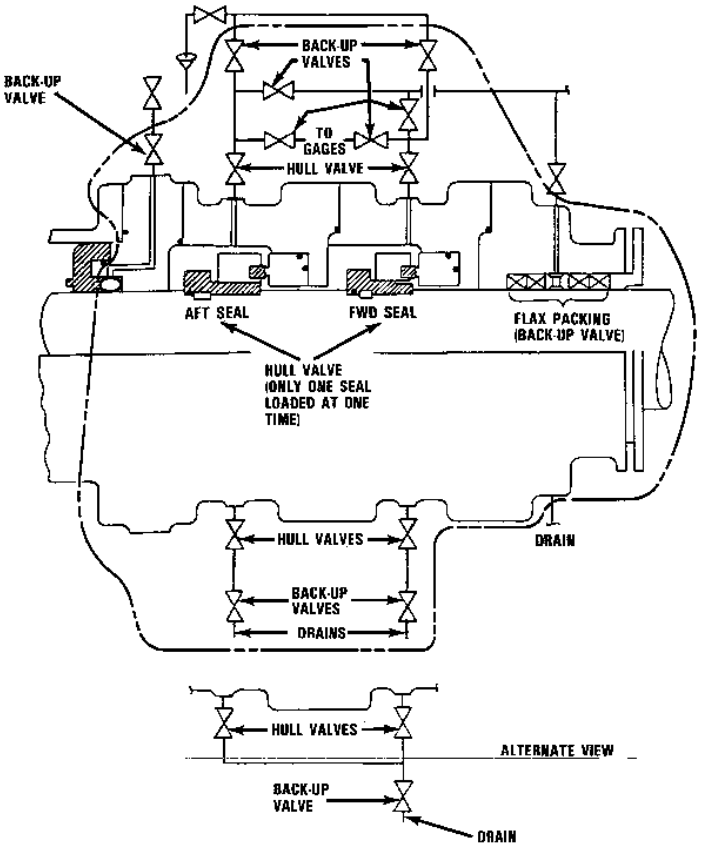

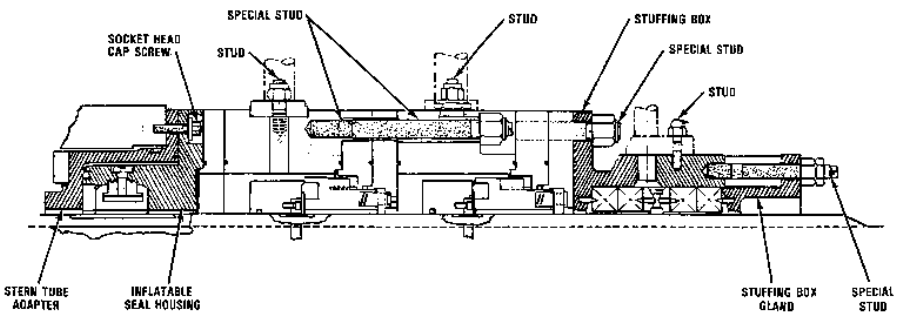

NOTE: CROSSHATCHED AND SHADED COMPONENTS REQUIRE SUBSAFE CERTIFICATION.

TYPICAL SHAFT SEAL DETAIL (SSN AND SSBN)

NOTE: The Pressure Hull Integrity Boundary is that part of the stern tube shaft seal assembly where failure would cause direct flooding of sea water into the hull. Example: Aft seal housing, forward seal housing, inflatable seal housing, stuffing box housing, gland, and fasteners used to make up the pressure boundary assembly.

Figure E-18. Typical Shaft Seal and Detail (SSN and SSBN).

APPENDIX F

SAMPLE DRAWINGS

F.1 GENERAL

This appendix provides a sample hull integrity envelope boundary drawing (see Figure F-1), a sample hull penetration drawing (see Figure F-2), a sample hole identification list (see Figure F-3), and a sample mapping drawing (see Figure F-4). It is intended that these samples be used in conjunction with the information contained in Section 4.6.9 to establish standard format and content for these types of drawings. It is not the intent of these samples to establish a rigid format from which the preparing activity cannot deviate, but to provide the guidance necessary to ensure that the content requirements are fulfilled.

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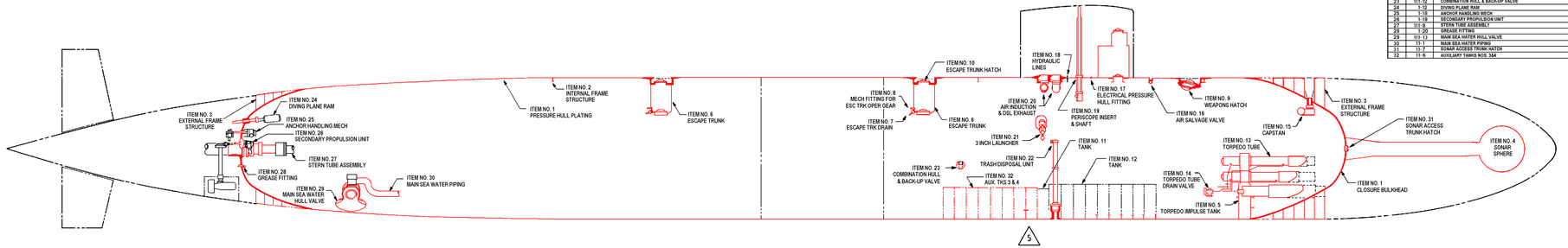

REV C

INDEX

I-1 SSCB 2 CHG 5

NOTES:

1. The boundaries of the hull integrity envelope are shown in RED. The boundaries of components penetrating the pressure hull envelope are included in the hull integrity envelope. The example components illustrated are representative of such penetrations and the reference figures provide clarifying detail.
2. Structure not shown in RED is indicated for clarity only.
3. Tank item no. 11 is representative of sanitary tanks no.1 and no. 3. These tanks are designed for test depth pressures but are not normally exposed to the differential between internal submarine pressure and the adjacent sea pressure below 200 feet. Only the boundary formed by the pressure hull is considered to be hull integrity envelope. Refer to applicable ship's drawings of internal frame structure for specific information on extent of the hull integrity envelope boundary.
4. Tank item no. 12 is representative of auxiliary tanks no. 1 and no. 2, forward and aft trim tanks, sanitary tank no. 2, NFO tank, and WRT tank. These tanks are not exposed to the differential between internal submarine pressure and the adjacent sea pressure. Only the boundary formed by the pressure hull is hull integrity envelope. Refer to applicable ship's drawing of internal frame structure for specific information on extent of the hull integrity envelope boundary.

SUMMARY OF LATEST CHANGE

(See △ symbol on body of figure.)

△5 Editorial Modifications.

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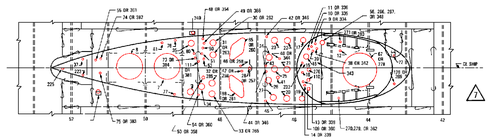
HULL INTEGRITY ENVELOPE BOUNDARIES

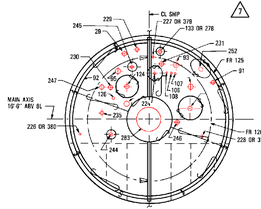
FIGURE I-1

SSCB 2 CHG 5

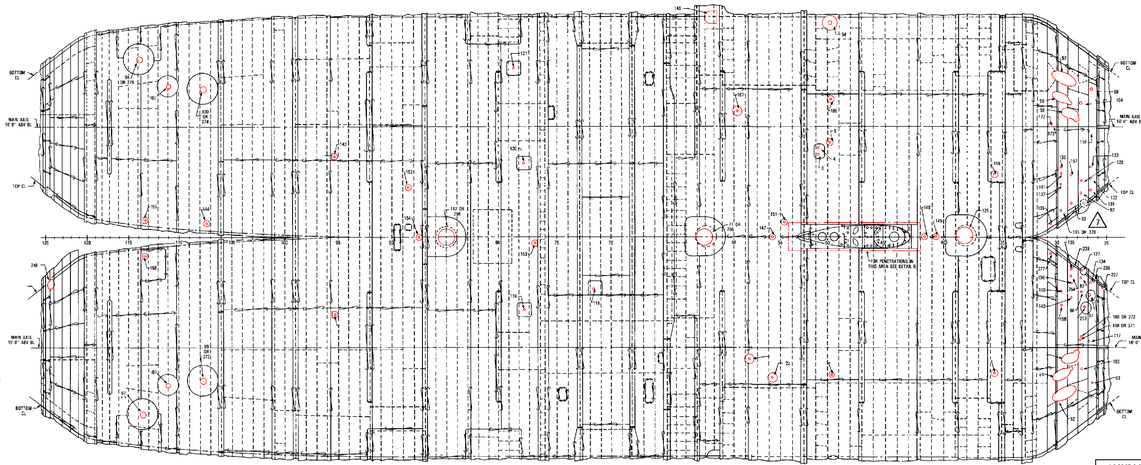
Figure F-1
Sample Hull
Integrity Envelope
Boundary Drawing



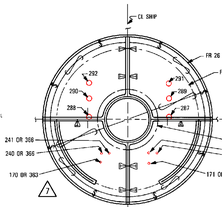
DETAIL B



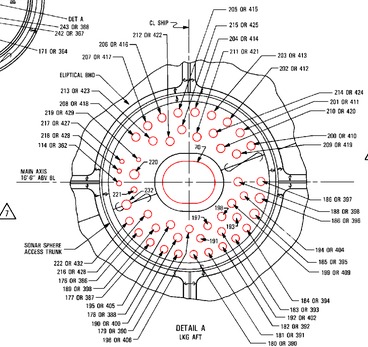
AFT ELLIPTICAL BHD
LKG FWD



I-2 SSCB-2 CHG 7



FWD ELLIPTICAL BHD
LKG AFT



DETAIL A
LKG AFT

REV C

NOTES:

1. Portions shown in red are hull integrity envelope penetrations. Surrounding hull integrity envelope structure is addressed elsewhere.
2. Penetrations are identified by hole identification list line number. The drawing referenced in the hole identification list, (Figure I-3), will provide exact location and detail.
3. Penetrations through escape trunks and imulse tanks are shown in Figures I-4 and I-6.
4. This figure developed from drawing 0010-345, NAVSHIPS SSN688-845-4454130.
5. Pressure hull shown expanded athwartships only, looking inboard.

SUMMARY OF LATEST CHANGE
(See △ symbol on body of figure.)

△1 Updated to show design development by adding new line numbers.

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BOUNDARY BOOK

PENETRATIONS IN
PRESSURE HULL COMPOSITE

FIGURE I-2

SSCB 2 CHG 7

NAVSEA 0924-062-0010

FSC 19

Figure F-2 Sample Hull
Penetration Drawing
Sheet 2 of 2

NOTES:

1. Hole identification list line numbers correspond with the hole identification numbers shown on figure 1-2.
2. This figure developed from drawing 0100-490, NAVSHIPS SSN688-845-4498407.

SUMMARY OF LATEST CHANGE

(See △ symbol on body of figure.)

△7 Added new line items to suit design development

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HOLE IDENTIFICATION LIST PRESSURE HULL

FIGURE C-2

SSCB 2 CHG 7

NO.	TITLE	CODE IDENT NO.	NNS & DD CO.	NAVSEA
			DRAWING NUMBERS	
	REFERENCES			
32	ELLIPTICAL BULKHEAD FWD & AFT	43689	1040-487	100-4403272
31	STERN TUBE BEARING HULL INSERT-CASTING	43689	1200-18	119-4403286
30	HATCH COVER TYPE "E" GEN ARR	43689	1502-97	123-4403553
29	BRIDGE ACCESS TK HULL INSERT	43689	1510-7	115-4498511
28	SECONDARY PROPULSION UNIT INBD TRAINING GEAR INDICATOR & INTERLOCK ASSEMBLY	43689	6102-40	201-4457142
27	EXT HYDR SYSTEM PIPING SHIPS CONTROL CENTER L/M SECT	43689	2301-71	516-4457773
26	LUBRICANT PIPING ARR WIND LS STRG & STOVG AND SEC PRPLN	43689	2011-79	520-4457037
25	HULL PEN-EJECT PUMP SEA VLV OR GR ASSY & DET	43689	6002-135	708-4494346
24	TORP EJECT PUMP SEA VLV OP GR-ARRANGEMENT	43689	6002-131	708-4457180
23	TORP EJECT PUMP SEA VLV OP GR-DET SHEET 1	43689	6002-132	708-4457181
22	TORPEDO & EJECTION TUBE SLEEVES	43689	2230-26	708-4454205
21	AIR IND/DSL EXH HULL & BACK-UP VALVES-MISC DET SHEET NO. 1	43689	6503-82	501-4457020
20	STERN DIVING GEAR ARRANGEMENT	43689	2013-40	518-4457078
19	STEERING GEAR ARRGT, AFT	43689	2010-118	518-4457074
18	AIR IN/DSL EXH HULL & BACK-UP VALVE-VALVE BODY SHEET NO. 2	43689	6503-80	501-4457019
17	MILITARY SPEC. SHEET STUFFING TUBE BULKHEAD PRESSURE PROOF	–	–	MIL-S-24235
16	AIR IND/DSL EXH HULL & BACK-UP VALVES-VALVE BODY SHEET NO. 1	43689	6503-79	501-4457018
15	SECONDARY PROPULSION UNIT INBD TRAINING GEAR DET SHEET NO. 3	43689	6102-43	201-4457145
14	SECONDARY PROPULSION UNIT ARRANGEMENT IN SHIP	43689	6102-26	201-4457139
13	3 INCH LAUNCHER ARRANGEMENT	43689	2270-26	711-4457299
12	STEERING & STERN DIVING GEAR HULL PENETRATIONS ASSEMBLY & DETAILS	43689	2010-147	518-4498071
11	PENETRATIONS AND ASSIGNMENT OF ELEC HOLES IN FWD ELLIPTICAL BHD	43689	4700-669	113-4497322
10	PENETRATIONS ELECTRICAL IN HULL AND TANKS	43689	4100-1483	113-4454527
9	PENETRATIONS-PRESS HULL FR 119-AFT	43689	1000-118	100-4497332
8	PENETRATIONS-PRESS HULL FR 87-119	43689	1000-117	100-4497331
7	PENETRATIONS-PRESS HULL FR 52-87	43689	1000-116	100-4497330
6	PENETRATIONS-PRESS HULL FR 42-47	43689	1000-115	100-4497329
5	PENETRATIONS-PRESS HULL FR 30-42	43689	1000-114	100-4497328
4	PENETRATIONS-PRESS HULL FR 25-30	43689	1000-113	100-4497327
3	PENETRATIONS-PRESS HULL FWD FR 25	43689	1000-112	100-4497326
2	PENETRATIONS-PRESS HULL FR 47-52	43689	1000-111	100-4497305
1	PRESS HULL ENVELOPE HOLE COMPOSITE-SHELL	43689	0100-345	845-4454130

85.100

Figure F-3 Sample Hole Identification List

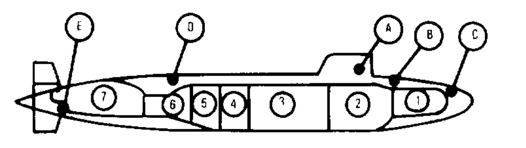
COMPARTMENT	REF	ASSIGNED JOINT NO.	LAST NO. USE'	NOS. USED AND DELETED
BOW COMPT	3	SEF13015-SEF13075	SEF13041	
	5	SEF10001-SEF10050	SEF10016	
ENGINE ROOM	4	SEA70001-SEA70039	SEA70024	
	6	SEA70040-SEA70059	SEA70053	

GENERAL NOTES

1. THIS DRAWING COMPOSITE LISTS ALL PIPE JOINT AND COMPONENT IDENTIFICATION–MAPPING AND PIPE CERTIFICATION LISTS–AND ALL QUALITY ASSURANCE LISTS FOR THIS PIPING OR MECHANICAL HULL BOUNDARY SYSTEM
2. THE BASIC JOINT LEGEND ABBREVIATIONS ARE AS FOLLOWS:

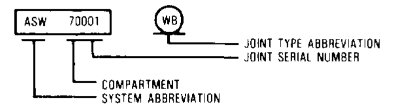
(BF) –	BRAZED, FACE FEED	(WB) –	BUTT WELD
(BP) –	BRAZED, INSERTED RING	(WS) –	SOCKET WELD
(HF) –	FASTNER	(WF) –	ROOT WELD
(F) –	FLANGED	(WL) –	SEAL WELD
(CN) –	CASTING	(FH) –	FLEX HOSE
(WA) –	ATTACHMENT WELD	(CU) –	CUNI ALLOYS

3. THE JOINT IDENT MAP IDENTIFIES ALL JOINTS–MECHANICAL BRAZED AND WELDED IN ACCORDANCE WITH BUSHIPS LTR SER. 525-0462 OF 20 DEC 1963.
4. THE NUMBERING SYSTEM OF JOINT IDENTIFICATION IS AS FOLLOWS:



SUPER STRUCTURE AND TANKS	(A) 1991–1999		BOW COMPT	(1) 10001–19999
	(B) 2001–3999		OPERATIONS	(2) 20001–29999
	(C) 4001-5999		MISSILE	(3) 30001–39999
	(D) 6001–7999		AMR #1	(4) 40001–49999
	(E) 8001-9999		RC	(5) 50001–59999
			AMR #2	(6) 60001 69999
			ENG ROOM	(7) 70001–79999

5. AN EXAMPLE OF A COMPLETE JOINT IDENTIFICATION NUMBER IS AS FOLLOWS:



PARALLELOGRAMS /ASW–70002/ (CN) ARE USED TO IDENTIFY SUBSAFE COMPONENTS WITHIN PIPING SYSTEM

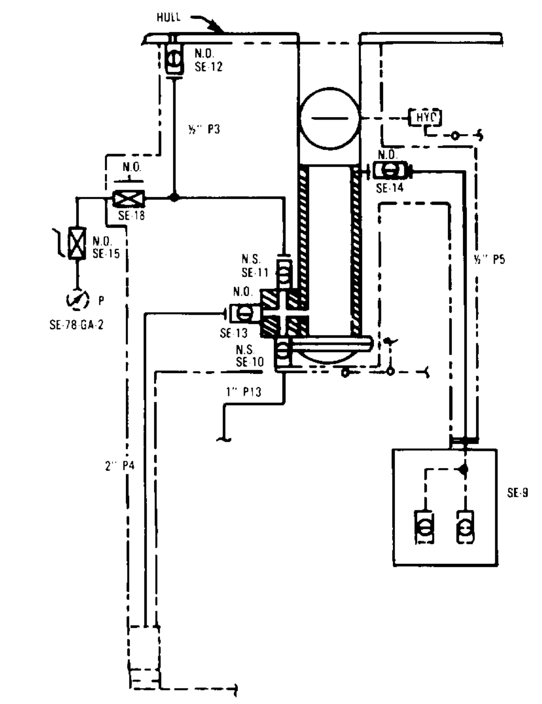
6. EACH JOINT IDENTIFICATION NUMBER SHOWN ON THIS DRAWING IDENTIFIES A SPECIFIC JOINT AND IS NOT DUPLICATED ANYWHERE ON THE SHIP.
7. SYMBOLS ARE IN ACCORDANCE WITH REFERENCE 1 UNLESS OTHERWISE DEFINED.
8. INSPECTION REQUIREMENTS LISTED IN PIPE POINT AND QUALITY ASSURANCE LISTS ARE ABBREVIATED AS FOLLOWS:

   RT – RADIOGRAPHIC TEST
   PT LIQUID PENETRANT TEST
   MT MAGNETIC PARTICLE TEST
   5XV – FIVE TIMES VISUAL
   UT – ULTRASONIC TEST
   VIS – VISUAL (NO MAGNIFICATION)
   VM – VERIFICATION OF MATERIAL

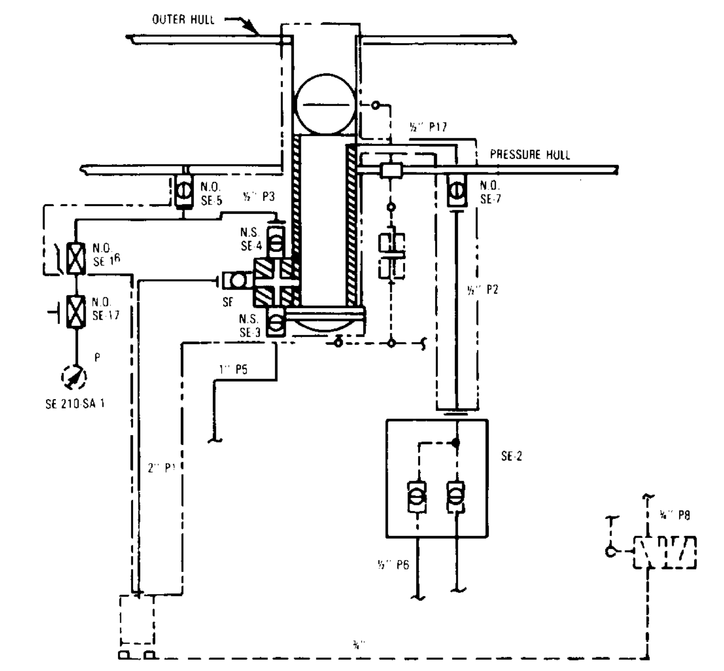
9. FOR ITEMS WHICH REFERENCE THIS NOTE, ACCEPTABLE DOCUMENTATION EXISTS PER NAVSHIPS LTR SSBN/5100 SER 603 425 OF 16 FEB 1973. TO PROVIDE SUBSAFE CERTIFICATION OF THESE ITEMS.
10. PIPING AND COMPONENTS ON SHEET 2 CIRCUMSCRIBED THUS [- - -] ARE SUBSAFE. ALL OTHER AREAS ARE NOT SUBSAFE

NO.	TITLE	CONTRACTOR DWG	NAVSHIPS DWG.	REV
21				
20				
19				
18				
17				
16				
15	SUBSAFE PENET–PIPING & MECH–FR 119 TO STERN	EBB 75415 01 X 10	SSBN616 113 2006940	
14	SUBSAFE PENET-PIPING & MECH–BOW TO FR 31	EBB 75415 01 X 2	SSBN616 113 2006933	
13	PIPING–TRIM & DRAIN BHD 31 & FWD–PLAN & ELEV	EBB 75651 13 X 01	SSBN616-508-2004235	
12	SIG EJECT–AFT CLEAR BORE IND & MISC DETS	EBB 75692 10 X 10	SSBN616 700 2005594	
11	SIGNAL EJECT PIPING	EBB 75692 10 X 13	SSBN616 700 2005597	
10	SIG EJECT–AFT–IMPULSE TK–ASSY & DET	EBB 75692 10 X 09	SSBN616-700-2005593	
9	PENETRATIONS IN PRESSURE HULL COMPOSITE	–	SSBN623 113 1134601	
8	SIGNAL EJECTOR–FWD–IMPULSE TK ASSY & DET	EBB 75692 06 X 09	SSBN616 700 2006054	
7	PIPING–SERVICE AIR BHD 31 FWD PL PORT EL	EBB 75765 15 X 06	SSBN616-513-2115028	
6	SUBSAFE–AFT SIGNAL EJECTOR–ARRGT IN SHIP (AIR OPER)	EBB 75692 10 X 1	SSBN616-700-2005586	M
5	SUBSAFE–FWD SIGNAL EJECTOR–ARRGT IN SHIP (HYD OPER)	EBB 75692 06 X 01	SSBN616-700-2006046	N
4	PIPING–J/I–SIGNAL EJECTOR AFT (SUBSAFE)	EBB 75692 10 13R01	SSBN616-700-4528886	A
3	PIPING–SIGNAL EJECTOR FWD (SUBSAFE)	EBB 75692 06 01R01	SSBN616-700-452863	B
2	DIAGRAM–SIGNAL EJECTOR FIRING SYS–SUBSAFE	EBB 75692 01 01R01	SSBN616-704-4528888	
1	PIPING SYMBOLS	EBB 2620 712 X 1	SS 845-2180678	–

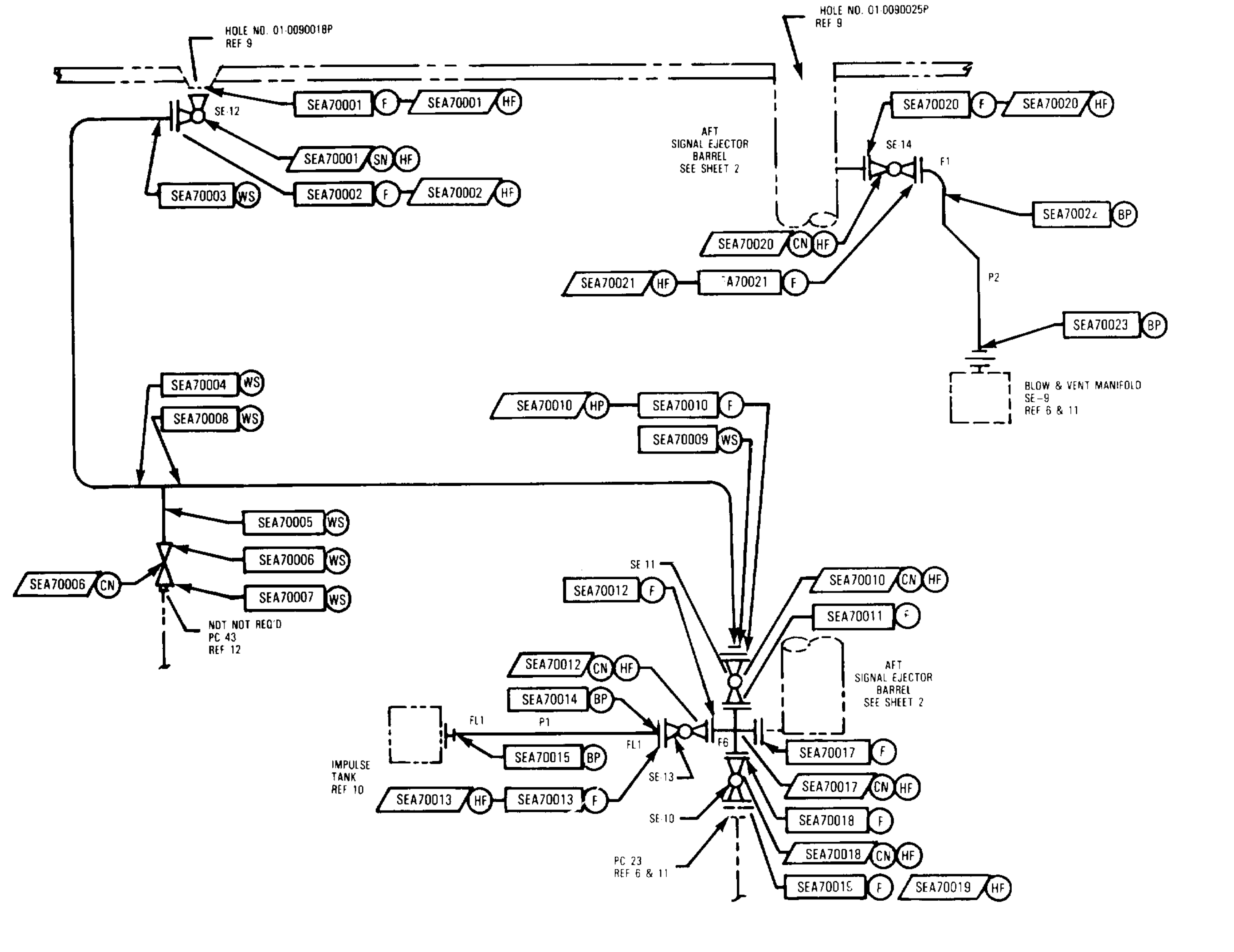
REFERENCES



AFT SIGNAL EJECTOR



FWD SIGNAL EJECTOR



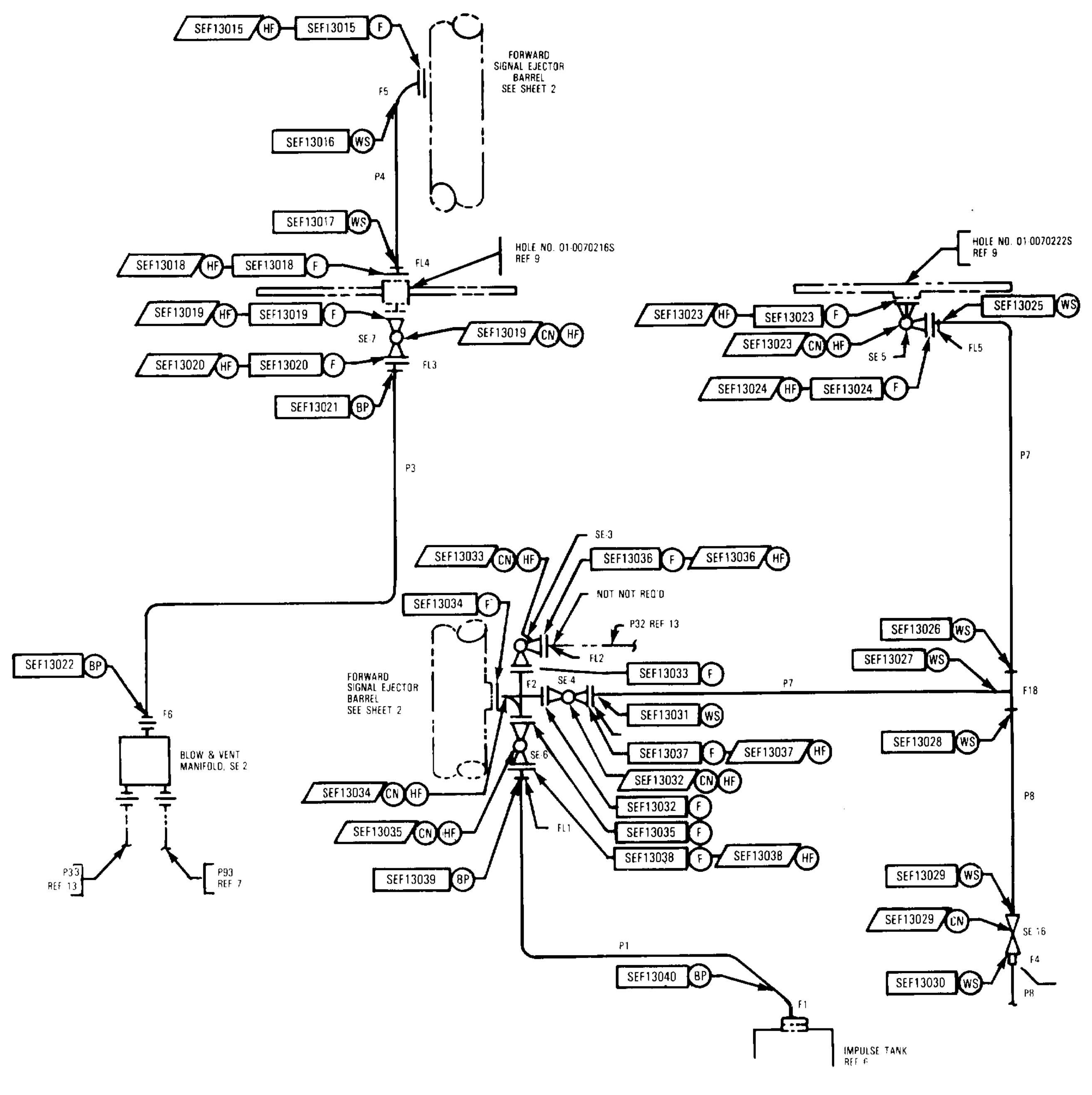
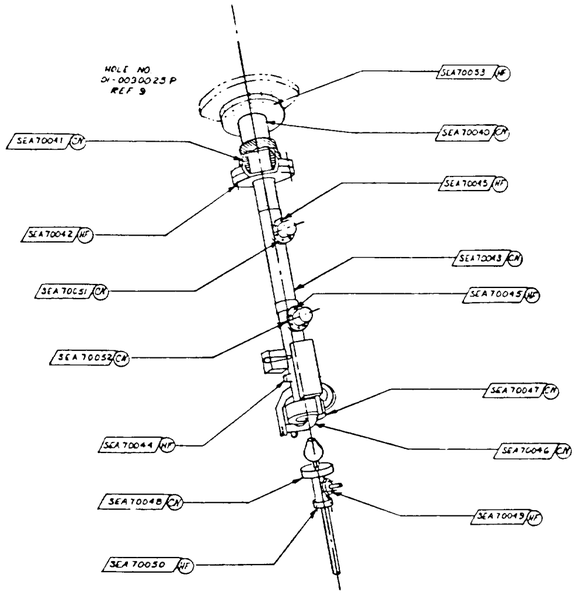
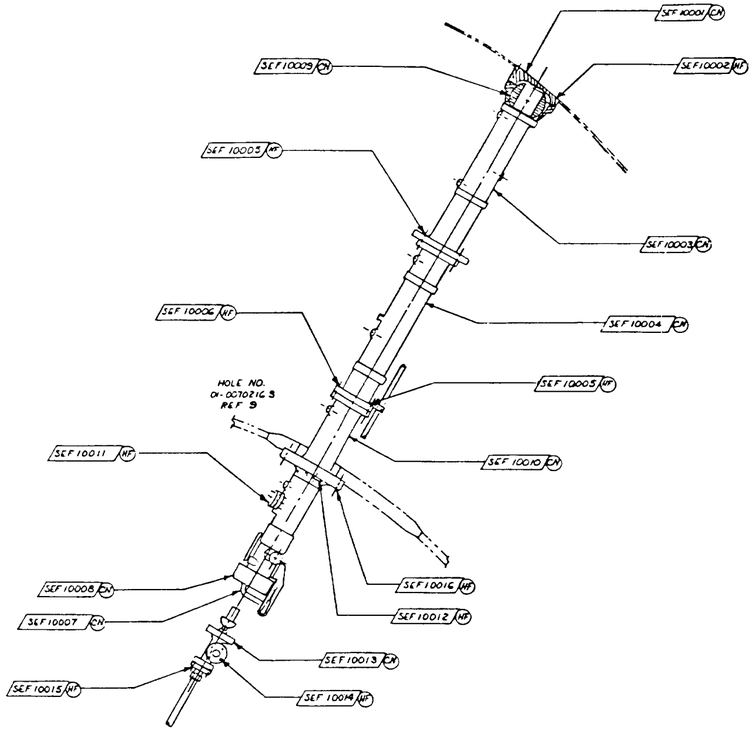


Figure F-4 Sample Mapping Diagram (Sheet 1 of 2)



AFT SIGNAL
EJECTOR
REF 6



FWD SIGNAL
EJECTOR
REF 5

LIST OF JOINTS
(NON-MECHANICAL)

JOINT LINE NO.	REV	JOINT IDENT NO.	ASSY/DET DWG REF	ASSY/DET DWG PC NO.	PIPE CLASS	TUBE/PIPE SIZE OD	TUBE/PIPE SIZE THK	INSPECTION (SEE NOTE *101) RT DEG	UT % BOND	ROOT LAYER PT	ROOT LAYER MT	ROOT LAYER 5XV	FINAL LAYER PT	FINAL LAYER MT	FINAL LAYER 5XV	REMARKS
0001		SEF13016WS	3		P1	00.50	-			X		X	X		X	
0002		SEF13017WS	3		P1	00.50	-			X		X	X		X	
0003		SEF13021BP	3		P3A-UT	00.50	-		60							
0004		SEF13022BP	3		P3A-UT	00.50	-		60							
0005		SEF13025WS	3		P1	00.50	-			X		X	X		X	
0006		SEF13026WS	3		P1	00.50	-			X		X	X		X	
0007		SEF13027WS	3		P1	00.50	-			X		X	X		X	
0008		SEF13028WS	3		P1	00.50	-			X		X	X		X	
0009		SEF13029WS	3		P1	00.50	-			X		X	X		X	
0010		SEF13030WS	3		P1	00.50	-			X		X	X		X	
0011		SEF13031WS	3		P1	00.50	-			X		X	X		X	
0012		SEF13039BP	3		P3A-UT	02.00	-		60							
0013		SEF13040BP	3		P3A-UT	02.00	-		60							
0014																
0015																
0016																
0017																
0018																
0019																
0020		SEA70003WS	4		P1	00.50	-			X		X	X		X	
0021		SEA70004WS	4		P1	00.50	-			X		X	X		X	
0022		SEA70005WS	4		P1	00.50	-			X		X	X		X	
0023		SEA70006WS	4		P1	00.50	-			X		X	X		X	
0024		SEA70007WS	4		P1	00.50	-			X		X	X		X	
0025		SEA70008WS	4		P1	00.50	-			X		X	X		X	
0026		SEA70009WS	4		P1	00.50	-			X		X	X		X	
0027		SEA700014BP	4		P3A-UT	02.00	-		60							
0028		SEA700015BP	4		P3A-UT	02.00	-		60							
0029		SEA700022BP	4		P3A-UT	00.50	-		60							
0030		SEA700023BP	4		P3A-UT	00.50	-		60							

* 101. 5 X VISUAL INSPECTION MAY BE SUBSTITUTED FOR PT INSPECTION ON ROOT LAYER.

Figure F-4 Sample Mapping Diagram (Sheet 2 of 2)

GLOSSARY OF TERMS

1. GENERAL.

This glossary contains an alphabetical list of terms appearing throughout the Submarine Safety (SUBSAFE) Requirements Manual and supporting references. These definitions are not intended to preclude other definitions or connotations used by other activities.

1.1 DEFINITIONS.

	A
ACCESS PLATES	Sections of plating which are removed, for access, installation, or removal of equipment, and are later reinstalled. Access plates do not involve cutting of pressure hull frames.
ADAPTER	A pressure containing device whose purpose is to provide transition from installed hull equipment or piping to a plug.
ATTRIBUTE	A characteristic or property associated with a given requirement.
AUDIT	An independent review conducted to compare an aspect of quality performance with a standard of performance.
	B
BACK-UP VALVE	A valve which, when closed, provides, in part or in whole, the second isolation boundary to sea pressure.
BOLTED PRESSURE BOUNDARY	Joints which utilize bolts, nuts, studs, stud-bolts, or screws to join two pressure boundary parts. Specifically included are joints meeting the above description located in piping runs, valves, piping system components, hull fittings, and machinery. Specifically excluded are joints, failure of which will not permit escape or intrusion of the controlled fluid.
BOUNDARY	See Submarine Safety Certification Boundary.
	C
CERTIFICATION	Written statement attesting that an item meets the specified requirements.

CERTIFICATION DOCUMENTATION	Objective Quality Evidence (OQE) that an item meets the requirements of this manual.
CERTIFICATION MAINTENANCE (SUBSAFE)	A process defined by those procedures, tests, and inspections required when hardware is renewed, altered, or replaced within the SUBSAFE Boundary, as well as the periodic checks or inspections required to assure continued satisfactory material condition for certification.
CERTIFIED (SUBSAFE)	The status of any item which is in compliance with all the applicable requirements of this manual.
CLOSURE BULKHEAD (Submarine)	Hull-end bulkheads designed to withstand collapse depth pressure.
CLOSURE PLATES	Those plates left off or removed for access, wherein at least one transverse frame is cut.
COAMING	Compensation material surrounding holes in structure and extending through on one side only and usually connected by a corner, groove tee, or fillet weld and which may provide all or partial compensation for the hole.
COLLAPSE DEPTH	The design depth beyond which the hull structure or hull penetrations are presumed to suffer permanent deformation or catastrophic failure to the point of total collapse.
CONFIGURATION CONTROL	The systematic evaluation, coordination, disposition, and implementation of all changes in the configuration of an item after formal establishment of its configuration identification.
CONTAINMENT BULKHEAD	A transverse bulkhead within the pressure hull envelope which functions to contain, within the compartment, damage resulting from a design-based casualty, within that compartment, other than a watertight integrity casualty. Containment bulkheads are considered pressure hull support structures for design and inspection requirements.
CONTROL SURFACES	Those portions of submarine structure external to the hull designed to provide steering, diving, or stabilization capabilities, such as rudders, stabilizers, and diving planes.
CONTROLLED ASSEMBLY	The proper assembly of a component documented to be in accordance with detailed drawings, including material requirements and clearance readings, verified and witnessed by a second person who is a quality assurance inspector.

CONTROLLED MATERIAL	Any material which must be identified, verified, and regulated throughout the manufacturing, installation, or repair process in order to meet the specifications required of the end product.
	D
DESIGN AGENT	The activity contracted to develop details of a design for which the activity retains responsibility (sometimes referred to as Design Yard).
DESIGN REVIEW	An engineering review to ensure structural adequacy in accordance with NAVSEA 0941-LP-041-3010, NAVSEA Submarine Safety Design Review Procedures Manual.
	E
EQUIVALENT AREA	The cross-sectional area, based on nominal design, used for determining flood path area for items not controlled by NPS size. Machining tolerances and corrosion allowances shall not be included.
	F
FAST CRUISE	A period immediately prior to initial underway trials by the Navy crew during which the ship is made available to the ship's force for dockside training. At-sea operating conditions will be simulated as far as practicable.
FLOODING CONTROL STATION	Control station that has, as its primary function, remote emergency operation of hull valves, hull closures, back-up valves, and flooding control valves.
FLOODING CONTROL VALVE	Valve other than a hull valve or back-up valve in a sea-connected system, which damage control considerations dictate must be shut to control flooding after a single casualty in the system in which it is installed.
FLY BY WIRE	Designating a system for ship control in which the controls are actuated by electrical impulses, as from a computer.
FUNCTIONAL AUDIT	Audit of an activity performing SUBSAFE work, designed to review processes, controls, procedures, and associated functions used to perform specific SUBSAFE related tasks. The audit is not normally oriented to a specific ship.
	G
GOVERNMENT FURNISHED AND CERTIFIED NON-REACTOR PLANT MATERIAL OR EQUIPMENT (GFM or GFE)	Material or equipment procured by NAVSEA or its designated agent and supplied to a shipbuilder, overhaul activity, or repair activity as certified for installation or

	use in new construction, overhaul, conversion, or repair.
GOVERNMENT INSPECTOR	Government official who is charged with the responsibility for assuring that the materials, processes, fabrication technique, and testing personnel meet specification and contractual requirements. In this regard, he may be as follows: a. For Government shipyards: The Shipyard Commander or his delegated representative. b. For commercial shipyards: The Supervisor of Shipbuilding or his delegated representative. c. For other organizations: The cognizant Government representative or the representative of another Government agency designated by or through the cognizant Government representative. d. For Forces Afloat: The Squadron/Group Commander or his delegated representative. e. For naval repair facilities: The commanding officer or his delegated representative.
	H
HARD TANK	Tank designed to withstand pressure equal to or greater than ship's test depth pressure.
HEAT	A quantity of metal that was molten simultaneously in the same container or processes just preceding solidification.
HOLDING BULKHEAD	A transverse watertight bulkhead within the pressure hull envelope which forms one boundary of an escape compartment and is designed to maintain watertight integrity up to the depth prescribed in the ship's building specification. Holding bulkheads are considered pressure hull support structure for design and inspection requirements.
HULL INTEGRITY BOUNDARY	Pressure hull plating (shell plate), pipe, components, etc., NPS 1/2 and larger, from the inboard joint of the backup valve (or equivalent) outboard to the hull.
HULL INTEGRITY FASTENERS	Male threaded type items such as bolts, socket head capscrews, studs, and bolt studs which are loaded by the differential between sea pressure and internal hull pressure, and which are a part of pressure hull integrity components or of systems penetrating the Pressure Hull Structure, from the pressure hull to and including

	the inboard joint of the backup valve or its equivalent. Nuts and lock-washers are specifically excluded.
HULL VALVE	A valve which, when closed, provides, in part or in whole, the first isolation boundary to sea pressure.
	I
INSERTS	Those structural reinforcements welded into the pressure hull envelope or other structure by some type of butt joint. Inserts reinforce the structure at openings or areas of high stress and may be of the same or greater thickness than the surrounding structure.
	J
JOINT IDENTIFICATION DRAWINGS	Drawings which provide identification, including a unique identification number, for mechanical, welded, or brazed piping joints.
	L
LEVEL I MATERIAL	Designation of material which must meet requirements of the Material Identification and Control System established by The Material Control Standard (Non-Nuclear) NAVSEA 0948-LP-045-7010.
LINERS	Structural reinforcements around a hole in plates welded by some type of tee or corner joint.
	M
MAINTENANCE REQUIREMENT CARD (URO/MRC)	Defines maintenance inspections and actions associated with Unrestricted Operations.
MAJOR DEPOT AVAILABILITY	An availability of six months or greater duration performed by activities under NAVSEA management or contract administration or as designated by the TYCOM or NAVSEA.
MATERIAL IDENTIFICATION AND CONTROL (MIC) NUMBER	A unique number assigned to material that provides traceability to Objective Quality Evidence (OQE)in accordance with NAVSEA 0948-LP-045-7010, Material Control Standard (Non-nuclear)
MAXIMUM AUTHORIZED OPERATING DEPTH	The depth that is authorized by the Fleet Commander-in-Chief (Submarine Force Commander), as the depth not to be exceeded in operations.
MAXIMUM SYSTEM PRESSURE	The highest pressure that can exist in a system or subsystem during any condition. Normal, abnormal, and emergency operation

	and casualty condition which may affect the system shall be considered in determining the maximum system pressure. In any system or subsystem with relief valve protection, the setting of the relief valve shall be taken as the maximum system pressure (relief valve accumulation may be ignored).
	N
NOMINAL PIPE SIZE (NPS)	A size designation for pipe and piping components but not an exact measurement or designation of capacity. The convention is to precede the size with "NPS", e.g., NPS 3-1/2. (The term "NPS" replaces the now obsolete term "IPS" (Iron Pipe Size).)
NON-DESTRUCTIVE TESTING (NDT)	All methods of testing used to detect or measure the properties or performance capabilities of material, parts, assemblies, equipment, or structures which do not impair the serviceability of the parts tested.
	O
OBJECTIVE QUALITY EVIDENCE (OQE)	Any statement of fact, either quantitative or qualitative, pertaining to the quality of a product or service based on observations, measurements, or tests which can be verified. (Evidence will be expressed in terms of specific quality requirements or characteristics. These characteristics are identified in drawings, specifications, and other documents which describe the item, process, or procedure.)
OPERATIONAL LIFE OF THE SHIP	The time duration from the point at which the ship is accepted by the Navy from New Construction, until it is decommissioned.
OVERVIEW AUDITS	Reviews of audits performed by another activity or organization to determine the adequacy of the areas covered, the SUBSAFE implications of any findings, and if all corrective actions have been taken.
	P
PENETRATIONS	Pipes, sleeves, trunks, etc., welded into the submarine structure by some type of groove tee, corner, or fillet weld. Pene-trations pass through and extend beyond one or both sides of the structure.
PENETRATOR	A device that penetrates the pressure hull boundary and is subjected to the differential between submergence and internal atmospheric pressure but is not a structural compensating member of the pressure hull structure.

PLANNING YARD	The activity tasked to function as the Design Agent after a ship's PSA.
PLUG	A pressure-containing threaded device, retained without nuts, that provides closure of an intermittently used drain, vent or pressure/instrumentation connection to hull equipment or piping for the purpose of maintenance, calibration, or evaluation of equipment or systems.
PRESSURE HULL ENVELOPE	All structural material in boundaries maintaining watertight integrity at collapse depth. This includes such items as pressure hull plating, sea chests, trunks, hatches, missile tubes, closure bulkheads, inserts, penetrations, sonar spheres, access plates, and hard tank plating.
PRESSURE HULL PLATING	Wrought steel material forming any portion of the Pressure Hull Envelope and directly exposed to the differential of sea pressure to internal hull pressure. This includes, but is not limited to, hard tank plating, end-closure bulkhead plating, cylindrical, conical, toriconical section plating, sea chests, and coamings.
PRESSURE HULL STRUCTURE	All structure whose function is to withstand collapse depth pressure, including the pressure hull envelope and supporting structure.
PRIMARY HULL CLOSURE	An item or portion of an item or system which provides the first isolation boundary to sea pressure.
PROCEDURE	Written instructions delineating all the essential elements and guidance necessary to produce acceptable and reliable products.

Q

QUALITY ASSURANCE DATA (QAD)	Certification Attributes/Requirements (e.g., MT, PT, RT, TQ, UT, VM, DR, VE, and VT), for which Objective Quality Evidence (OQE) must be available for review by the Supervisor of Shipbuilding and NAVSEA.
QUALITY ASSURANCE (QA)	A systematic review of quality control, records, and production actions which will provide adequate proof and confidence that work performed or material manufactured will perform as designed and that there is documentary evidence to this effect.
QUALITY CONTROL (QC)	The system of on-the-job supervision/ management and inspection which identifies and prevents improper workmanship and/or materials from being produced.

R

RE-ENTRY CONTROL	Specific procedures, required documentation, and testing designed to ensure that the previous level of integrity of a SUBSAFE certified system is restored to its originally certified condition when work is accomplished within the SUBSAFE Boundary.

S

SEA CHEST	A recess or hull-connected component in the Pressure Hull Envelope which conducts sea water to or from a piping system.
SEA-CONNECTED SYSTEM	Any system that can be open to sea in any mode of operation.
SEA WATER SYSTEM	Any system that continuously draws suction from the sea, circulates sea water, and discharges into the sea.
SEAL WELDS	Welds, provided for a fluid containment function only, as in a closure where strength is provided by a separate device.
SECONDARY HULL CLOSURE	An item or portion of an item or system which provides an isolation boundary to sea pressure when the primary hull closure has been penetrated.
SELECTED RECORD DATA	Tables, charts, drawing indices, allowance lists, damage control books, and other data (excluding drawings) specifically selected for their reference value, and maintained current throughout the life of the ship.
SELECTED RECORD DRAWINGS	A designated group of drawings made applicable to an individual ship by illustrating final shipboard installations of important features, systems, and arrangements that must be maintained up to date and correct throughout the life of the ship.
SHAFT HOLDING DEVICE	Any item or component designed to prevent a shaft from moving either inboard or outboard after a shaft failure for a distance equal to or greater than the depth of the structural material being penetrated by the shaft.
STRENGTH TEST	A hydrostatic test conducted at a pressure that is a specified percentage above the system operating pressure.
STRUCTURAL BULKHEAD	A complete or partial watertight or non-watertight bulkhead which supports the pressure hull or non-pressure hull.

SUBMARINE SAFETY CERTIFICATION BOUNDARY	The areas within which the requirements of the Submarine Safety (SUBSAFE) Requirements Manual apply.
SUBSAFE	An acronym for Submarine Safety indicating identification to the specific requirements of this manual.
SUBSAFE CERTIFICATION AUDIT (SSCA)	Audits performed on an individual ship basis to provide assurance that the material condition of that submarine for systems and components worked by NAVSEA managed activities is satisfactory for unrestricted operations to test depth.
SUPERVISING AUTHORITY	The officer designated by the Commander, Naval Sea Systems Command, to represent the Navy Department at a shipyard; normally, he is a Supervisor of Shipbuilding, Conversion and Repair or the Commander of a naval shipyard.
SUPPORT STRUCTURE	All structure whose function is to contribute to the ability of the pressure hull envelope to withstand collapse depth pressure, but does not itself form part of the watertight boundary under normal operations. This includes items such as pressure hull frames, hard tank framing, transverse structural floors acting as frames, holding bulkheads, and that portion of any internal or external bulkhead functioning as a frame. (a) When transverse floors and bulkheads act as frames, only the first 18 inches off the pressure hull plating, measured normal to the ship's axis from the surface to which the floor or bulkhead is attached, is to be considered as pressure hull framing (i.e., support structure), unless otherwise specified. (b) When frames have nominal depths greater than 18 inches and transition into floors and bulkheads, only the nominal depth of the frame in way of floors or bulkheads is to be considered as pressure hull framing, unless otherwise specified.
SYSTEM OPERATING PRESSURE	The maximum pressure at which a system operates under normal service conditions.
	T
TEST DEPTH	Depth as prescribed by the detail specifications for building a particular submarine.
TIGHTNESS TEST	A hydrostatic test conducted at the system operating pressure.
TYCOM	Type Commander - For the purposes of the SUBSAFE Manual, reference to “TYCOM” means COMSUBLANT and/or COMSUBPAC.

V

VENTED RESERVOIR	A hard tank which is vented inboard to internal atmospheric pressure (i.e., does not see submergence pressure) during normal operations and which possesses some type of capacity-limiting feature.
VERTICAL AUDIT	Audit of documentation that was used to SUBSAFE certify components from receipt through final disposition (e.g., removal from system, repair/replacement, shop testing, reinstallation in system, and post-installation testing).
VISUAL TESTING (VT)	A certification attribute used to visually verify compliance with applicable requirements or specifications.
VITAL EQUIPMENT	Those normal and emergency components requiring immediate and follow-up operation to effect recovery from flooding.

1.2 ABBREVIATIONS AND ACRONYMS.

The following is an alphabetical listing of abbreviations and acronyms which appear throughout the Submarine Safety (SUBSAFE) Requirements Manual and supporting references.

ACN	ADVANCE CHANGE NOTICE
AERP	ADVANCED EQUIPMENT REPLACEMENT PROGRAM
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AMR	AUXILIARY MACHINERY ROOM
AWP	AVAILABILITY WORK PACKAGE
ASW	AUXILIARY SEA WATER
BCP	BALLAST CONTROL PANEL
BUSHIPS	BUREAU OF SHIPS
CAD	CERTIFYING ACTIVITY DESIGNATOR
CASREP	CASUALTY REPORT
CFE	CONTRACTOR FURNISHED EQUIPMENT
CFM	CONTRACTOR FURNISHED MATERIAL
CHENG	CHEIF ENGINEER
CIM	CONTROLLED INDUSTRIAL MATERIAL
CNO	CHIEF OF NAVAL OPERATIONS
COMNAVSEASYSCOM	COMMANDER, NAVAL SEA SYSTEMS COMMAND
COMSUBLANT	COMMANDER, SUBMARINE FORCE, U.S. ATLANTIC FLEET
COMSUBPAC	COMMANDER, SUBMARINE FORCE, U.S. PACIFIC FLEET
CRES	CORROSION RESISTANT STEEL
CSMP	CURRENT SHIP’S MAINTENANCE PROJECT
DA	DEPOT AVAILABILITY
DDGOS	DEEP DIVING GENERAL OVERHAUL SPECIFICATION
DDS	DESIGN DATA SHEET
DLA	DEFENSE LOGISTICS AGENCY
DMP	DEPOT MODERNIZATION PERIOD
DR	DESIGN REVIEW
DRPM	DIRECT REPORTING PROGRAM MANAGER
DSW	DIESEL SEA WATER
EHF	ELECTRICAL HULL FITTING
EMBT	EMERGENCY MAIN BALLAST TANK
ERP	EXTENDED REFIT PERIOD
EPL	ENGINEERING PARTS LIST
ET	EDDY CURRENT TEST
GFE	GOVERNMENT FURNISHED EQUIPMENT
GFI	GOVERNMENT FURNISHED INFORMATION
GFM	GOVERNMENT FURNISHED MATERIAL
HM&E	HULL MECHANICAL AND ELECTRICAL
HSS	HIGH STRENGTH STEEL
HY	HIGH YIELD
INDMAN	INDUSTRIAL MANAGER
IMA	INTERMEDIATE MAINTENANCE ACTIVITY
IPS	IRON PIPE SIZE
INST	INSTRUCTION
ISIC	IMMEDIATE SUPERIOR IN COMMAND
LID	LIMITED IN DEPTH
LI	LEVEL I
MBT	MAIN BALLAST TANK
MCR	MANUAL CHANGE REQUEST
MEL	MATERIAL ENGINEERING LABORATORY
MCDR	MATERIAL CERTIFICATION DESIGN REVIEW
MIC	MATERIAL IDENTIFICATION AND CONTROL
MIL-STD	MILITARY STANDARD
MRC	MAINTENANCE REQUIREMENT CARD
MRPs	MAINTENANCE AND REPAIR PROCEDURES
MSW	MAIN SEA WATER
MT	MAGNETIC PARTICLE TEST

ABBREVIATIONS AND ACRONYMS (Cont'd)

NAVSEA/NAVSEASYSCOM	NAVAL SEA SYSTEMS COMMAND
NAVSEALOGCEN	NAVSEA LOGISTICS CENTER
NAVICP-Mechanicsburg	NAVAL INVENTORY CONTROL POINT - MECHANICSBURG
NAVSHIPS	NAVAL SHIP SYSTEMS COMMAND
NSWCCD-SSES	NAVAL SURFACE WARFARE CENTER, CARDEROCK DIVISION NAVAL SHIP SYSTEMS ENGINEERING STATION
NAVSUP	NAVAL SUPPLY SYSTEMS COMMAND
NDT	NONDESTRUCTIVE TEST
NDV	NO DELAY OF VESSEL
NPS	NOMINAL PIPE SIZE
NRRO	NAVAL REACTOR REPRESENTATIVE OFFICE
NSTM	NAVSHIPS TECHNICAL MANUAL
NUSC	NAVAL UNDERWATER SYSTEMS CENTER
NUWC	NAVAL UNDERSEA WARFARE CENTER
OIC	OFFICER IN CHARGE
OPNAV	OFFICE OF THE CHIEF OF NAVAL OPERATIONS
OQE	OBJECTIVE QUALITY EVIDENCE
ORDALT	ORDNANCE ALTERATION
OWP	OVERHAUL WORK PACKAGE
PEO	PROGRAM EXECUTIVE OFFICER
PMS	PROGRAM MANAGER, SHIPS
PSA	POST SHAKEDOWN AVAILABILITY
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAGE
PT	LIQUID PENETRANT INSPECTION
QA	QUALITY ASSURANCE
QAD	QUALITY ASSURANCE DATA
QAO	QUALITY ASSURANCE OFFICER
QC	QUALITY CONTROL
RAV	RESTRICTED AVAILABILITY
REC	RE-ENTRY CONTROL FORM
RISIC	RUBBER INSERT SOUND ISOLATION COUPLING
ROH	REGULAR OVERHAUL
RT	RADIOGRAPHIC INSPECTION
SDI	SHIP'S DRAWING INDEX
SEPM	STEAM AND ELECTRIC PLANT MANUAL
SHIPALT	SHIP ALTERATION
SIB	SHIPS INFORMATION BOOK
SMIC	SPECIAL MATERIAL IDENTIFICATION CODE
SOE	SUBMERGED OPERATING ENVELOPE
SPAWAR	SPACE WARFARE
SPALT	SPECIAL PROJECT ALTERATION
SPM	SECONDARY PROPULSION MOTOR
SRA	SELECTED RESTRICTED AVAILABILITY
SRD/D	SELECTED RECORD DRAWINGS/DATA
SSCA	SUBSAFE CERTIFICATION AUDIT
SSCAP	SUBSAFE CERTIFICATION AUDIT PLAN
SSCB	SUBMARINE SAFETY CERTIFICATION BOUNDARY
SSDR	SUBSAFE DESIGN REVIEW
SS LAR	SUBSAFE LIAISON ACTION REQUEST
SSIC	SUBSAFE IMPROVEMENT COMMITTEE
SSM	SHIP SYSTEMS MANUAL
SSMD	SUBSAFE MAPPING DRAWING
SSPD	SUBSAFE PROGRAM DIRECTOR
SSOC	SUBMARINE SAFETY OVERSIGHT COMMITTEE
SSTG	SHIP SERVICE TURBINE GENERATOR
SSSTG	SUBMARINE SAFETY STEERING TASK GROUP
SSWG	SUBMARINE SAFETY WORKING GROUP
SUBBASE	SUBMARINE BASE

ABBREVIATIONS AND ACRONYMS (Cont'd)

SUBMEPP	SUBMARINE MAINTENANCE ENGINEERING, PLANNING AND PROCUREMENT ACTIVITY
SUBSAFE	SUBMARINE SAFETY
SUPSHIP	SUPERVISOR OF SHIPBUILDING, CONVERSION AND REPAIR
TAV	TENDER AVAILABILITY
TDU	TRASH DISPOSAL UNIT
TQ	TORQUE
TR	TIME REQUIRED
TRIPER	TRIDENT PLANNED EQUIPMENT REPLACEMENT
TRS	TECHNICAL REPAIR STANDARD
TVD	TECHNICAL VARIANCE DOCUMENTATION
TYCOM	TYPE COMMANDER
URO	UNRESTRICTED OPERATIONS
UT	ULTRASONIC INSPECTION
VE	VITAL EQUIPMENT
VLS	VERTICAL LAUNCH SYSTEM
VM	VERIFICATION OF MATERIAL
VT	VISUAL INSPECTION

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SUBSAFE REQUIREMENTS MANUAL

INDEX

1. GENERAL

This index identifies manual locations where listed terms receive significant coverage. For any one term, not every page appearance may be shown. Page numbers are prefaced with their associated Chapter or Appendix identifier (e.g., Chapter 1, page 2 is shown as “1-2” and Appendix D, Page 10 as “D-10”).

2. TERMS

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SUBMARINE SAFETY (SUBSAFE) REQUIREMENTS MANUAL

TABLE OF REFERENCES

1. GENERAL.

When documents are referenced by this manual, the effective issue of the document (as revised or amended) shall be used. The effective issue is as specified by the contract.

1.1 TECHNICAL PUBLICATIONS.

NAVSEA 0900-LP-001-7000	Fabrication and Inspection of Brazed Piping Systems
NAVSEA 0900-LP-079-5010	Ship Repair Contracting Manual (Repair Manual) for Supervisors of Shipbuilding, Conversion and Repair, USN and Fleet Personnel
NAVSEA 0900-LP-079-6010	Ship Acquisition Contract Administration Manual (SACAM)
NAVSEA 0902-LP-018-2010	General Overhaul Specifications for Deep Diving SSBN/SSN Submarines (DDGOS)
NAVSEA 0905-LP-485-6010	Manual for the Control of Testing and Ship's Conditions
NAVSEA 0924-021-1010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (AGSS 555)
NAVSEA 0924-LP-040-2010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (NR-1)
NAVSHIPS 0924-048-0010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSN 637 Class)
NAVSHIPS 0924-051-8010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSN 640 Class)
NAVSHIPS 0924-055-1010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSN 594 Class)
NAVSHIPS 0924-056-0010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSN 671)
NAVSEA 0924-LP-064-8010 Volume I (MRC 001-021) and Volume II (MRC 022-043)	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSN 688 Class)
NAVSEA 0941-LP-041-3010	NAVSHIPS Submarine Safety Design Review Procedures Manual

NAVSEA 0948-LP-045-7010	Material Control Standard (Non-Nuclear)
NAVSEA 0989-LP-037-2000 (C)	General Reactor Plant Overhaul & Repair Specifications (Nuclear) (U)
NAVSEA 0989-LP-062-4000 (C)	Naval Nuclear Quality Control Manual for Shipyards (U)
NAVSEA SL720-AA-MAN-010	Fleet Modernization Program, Management and Operations Manual
NAVSEA SL730-AA-OMI-010 (C)	Conduct of Surveillance of Submarine Piping Systems (U)
NAVSEA S6430-AE-TED-020 Vol 2	Technical Directive for Piping Devices, Flexible Rubber Insert Sound Isolation Couplings (RISIC)
NAVSEA S9074-AR-GIB-010/278	Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels
NAVSEA S9505-AM-GYD-010	Submarine Fastening Criteria (Non-nuclear)
NAVSEA S9520-AA-MMA-010	Repair of Submarine Seawater Ball Valves (Non-nuclear)
NAVSEA TL710-AD-MAN-010	SSBN-726 Class Depot Availability Period (DAP) Standardized Test Program Manual
NAVSEA TL855-AA-STD-010	Naval Shipyard Quality Program Manual
NAVSEA T0700-AA-PRO-010	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSBN 726 Class)
NAVSEA T9SSN-W4-GYD-010	SSN 688 Class Standardized Hull, Mechanical and Electrical Test Program
NAVSEA T9074-AD-GIB-010/1688	Requirements for Fabrication, Welding, and Inspection of Submarine Structure
NAVSEA T9074-AS-GIB-010/271	Requirements for Nondestructive Testing Methods
NAVSEA T9081-AD-MMO-O10 Volume I NAVSEA T9081-AD-MMO-020 Volume II	Maintenance Requirements for Continued Unrestricted Operations to Design Test Depth (SSN 21 Class)
NAVSEA T9512-AC-TRQ-010	SS-SSN-SSBN Submarine Snorkel Systems

1.2 INSTRUCTIONS/NOTICES.

CINCLANTFLT/CINCPACFLTINST 4790.3	Joint Fleet Maintenance Manual (JFMM)

COMSUBLANTNOTE C3120	Promulgation of Authorized Submarine Test and Operating Depth for Submarine Force, U.S. Atlantic Fleet Submarines (U)
COMSUBPACNOTE C3120	Promulgation of Submarine Authorizations and Restrictions for Submarine Force, U.S. Pacific Fleet (U)
NAVSEAINST 4855.30	Control of Non-Level Material
NAVSEAINST 5400.95	Surface Ship and Submarine Work-Policy for Non-Nuclear Non-Conformance Approvals and Delegation of Technical Authority to Shipyard and SUPSHIP Chief Engineers.
NAVSEAINST C9094.2	Submarine Valve Operation Requirements for Builders and Post-Overhaul Sea Trial Test Dives (U)
NAVSEANOTE 5000	Identification of Activities Authorized to Perform SUBSAFE Work
NAVSUP/NAVSEAINST 4440.16	Level I/SUBSAFE (LI/SS) Stock Program
OPNAVINST 9080.3	Tests and Trials of Naval Nuclear Powered Ships Under Construction, Modernization, Conversion, Refueling, and Overhaul; Process for
OPNAVINST 9110.1	Submarine Tests and Operating Depths; Policy Concerning (U)
SECNAVINST 5040.3	Naval Command Inspection Program

1.3 STANDARDS.

ISO-9001	Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation and Servicing
ISO-9002	Quality Systems - Model for Quality Assurance in Production, Installation and Servicing
MIL-STD-438	Schedule of Piping, Valves, Fittings, and Associated Piping Components for Submarine Service
MS17828	Nut, Self-locking, Hexagon, Regular-height, (Non-metallic insert) 250 Degrees F., Nickel-Copper Alloy

1.4 SPECIFICATIONS.

MIL-I-45208	Inspection System Requirements
MIL-N-25027	Nut, Self-Locking, 250 Deg. F, 450 Deg. F and 800 Deg. F
MIL-Q-9858	Quality Program Requirements
MIL-S-1222	Studs, Bolts, Hex Cap Screws, Socket Head Cap Screws and Nuts

1.5 SUBMARINE MAINTENANCE STANDARDS (TECHNICAL REPAIR STANDARDS/MAINTENANCE AND REPAIR PROCEDURES).

TRS 0203-086-009	Technical Repair Standard for SSN and SSB(N) Submarine Main Propulsion Shafting Refurbishment
MRP 2430-081-001	

1.6 LETTERS.

BUSHIPS ltr Ser 525-0462, dated 20 December 1963	Submarine Certification Criterion

1.7 DRAWINGS.

NAVSEA DWG 803-6397299	EMBT Blow Rate Calculation Procedure